Volume 89 Number 27

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

The Week In Steel

TO THE potter's field goes 1931. No tears, no regrets, no mourners. Because it offers a clean slate, 1932 will be welcomed, but substantiating this hope is the tradition of steel that production never declines more than two years consecutively. Therefore, after 1930 and 1931, a year of improvement should be at hand. As far back as 1885 records of the American Iron and Steel institute may be searched (page 18), and this maxim holds. Save for two periods during which output slumped for three years, the same law governs pig iron. In many respects the present market situation resembles the close of 1893, when the industry was gathering its strength after the panic of 1892.

Pipe Mills Eager for Natural Gas for East

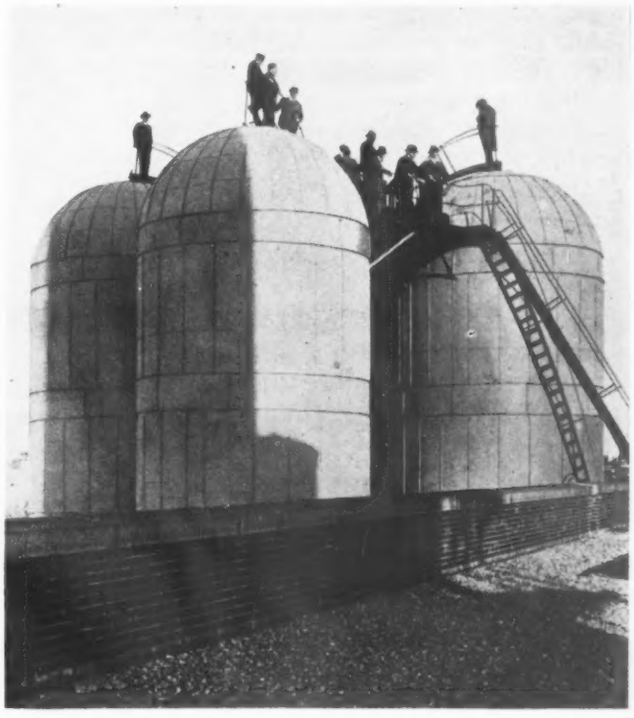
This week, like last, affords no test of this cycle as the holidays have laid an unusually heavy hand upon the markets. Presumably, it will be too much to expect demand and production to snap back measurably early in January, but a fair amount of specific work is developing. . . . There is talk at Chicago that a natural gas pipe line from Texas to Buffalo, now in the projected stage, will require 200,000 tons of steel pipe (page 46). An extension of Pennsylvania gas lines into New England also swells prospective business. . . . For Mississippi river improvement work at Rock Island, Ill., 9600 tons of steel (pages 44, 45) including 5000 tons of bars and 3000 tons of shapes, will shortly be awarded. . . . Structural steel orders (page 39) are the largest since the first week of October.

Believe Railroad Situation Improving

Dark as the railroad financial situation appears, remedial measures lend encouragement. The Reconstruction Finance Corp. bill which is expected to be reported back to the senate about Jan. 10 (page 13) will not only liberalize discounting but also stabilize railroad securities. . . . Chicago rail mills expect this measure and the Railroad Finance Corp., which will distribute revenue from increased freight rates (page 43), to develop some track material needs. . . . Although organized railroad labor is in a trading mood, advocating a 6-hour day and 5-day week (page 13), an early adjustment of railroad wage rates still is believed imminent.

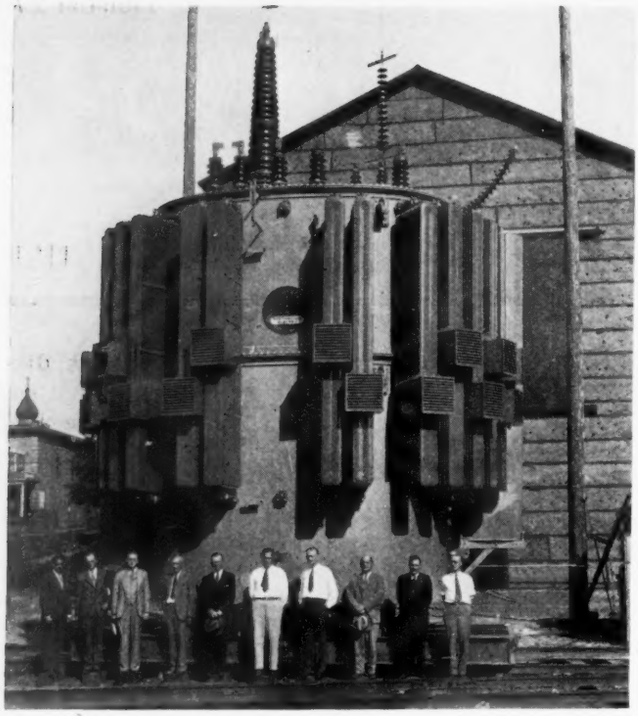
Now Order Pound at a Time

The railroads, with understandable prudence, are not disposed, however, to buy freely until relief is a fact. One large trunk line recently placed an order for a steel part weighing one pound (page 11), to be shipped by mail. . . . Construction of dirigibles may be the entering



Acme Photo

Bottling steam in Denmark: These are storage tanks, or power reservoirs, designed by a Swedish engineer, to equalize pressure, by taking up steam at slack periods and conserving it to aid in carrying peak loads



To prove that these new type transformers are lightning proof, Westinghouse Electric & Mfg. Co. also had to build a 3,500,000-volt "lightning generator." Transformers are for use in Baltimore

wedge of new passenger competition for railroads but at present it is providing them a departure in freight business. In addition to ten special cars for transporting helium, a new type of freight car (page 13), on which compressors are mounted, will be employed to salvage this expensive gas in case of mishap.

Low Trade Makes High Tariffs Alluring

While British steelmakers are not reconciled to the delay, discussion of a tariff on their products (page 51) will hold over until February. . . . Thus far, British antidumping orders affect (page 13) only 5 per cent of American trade. . . . The tariff commission, reporting to the senate on the cost of producing copper, suggests (page 13) that an increase instead of a decrease is to be expected. . . . Germany, feeling the contraction of its foreign trade, proposes to lower domestic prices to stimulate trade (page 51). France's domestic market also lags, giving impetus to a movement for the formation of an international export syndicate.

Cycle for Sheets Being Shortened

Sheets are claiming much technical thinking. . . . An important adjunct to the widely-advertised combination method of rolling hot sheets is a feeder and catcher device. Tilting tables are placed (page 26) on either side of the mill, and as the sheet passes through the rolls the catcher table elevates, returning the sheet to the feeder table over the top roll. . . . And when these sheets arrive at the receiving dock of a certain user in Detroit a synchronized system for handling them, using two types of mobile equipment (page 33) enables an 80,000-pound car to be unloaded in 15 to 20 minutes.

Red Ore Splits Yellow Races

It may have been with an eye on the 738,000,000 metric tons of 34-36 per cent iron ore which constitute the known deposits that Japan recently extended her influence in Manchuria (page 11). Development of steelworks has been retarded because the prospective consumers lay outside Chinese territory. . . . By comparison the Lake Superior district's deposits are estimated at 4 to 6 billion tons, varying according to the quality of ore included, but only 1,994,656 tons were on Lake Erie docks Dec. 1 (page 43), which is less than normal despite the slow shipping season. The outlook for the ore trade would be brighter if consumption were nearer normal.

Russia Levels Metals, Like People

Russia appears as energetic in her laboratories as in the field with her 5-year program. The various metallurgical institutes at Leningrad announce (page 12) three developments —covering sheet metal with aluminum on one side as a substitute for tin plate; covering sheet steel with copper on both sides to provide "copper" utensils for the laboratory and kitchen; fusing aluminum and silica electrolytically, resulting in "silumin" for automobile and aviation uses. . . . A new high-elastic nickel steel developed in the United States (page 28) requires no heat treatment to develop its physical properties, can be worked hot or cold or welded without lowering its strength, would save 4 per cent in the weight of steel for ocean liners.

No Private Life Left for Plates

Improved plates for such liners as well as for tanks, car sides, welded pipe lines and other large outlets for plates should be a result of the creation of a research fellowship (page 11) by an eastern producer. . . . A less constructive project, although in the interest of peace, is the demolition of the battleship FLORIDA at Philadelphia (page 11), causing the navy to offer 16,400 tons of scrap, mostly plates, Jan. 6. . . . A new use for plates originates in Denmark (page 9), where engineers have built storage tanks for steam. . . . Annealing of large welded pressure vessels to remove strains incident to welding calls for a furnace of gargantuan proportions, built at Barberton, O. (page 27). It is 60 feet long, 14 feet wide, with 9 inches of insulating brick, erected outdoors.

Manchuria Attractive for Large Deposits of Iron Ore

WASHINGTON—Manchuria, over which Japan has extended its control, is estimated to have iron ore deposits totaling 738,000,000 metric tons with an iron content of 34 to 36 per cent.

Deposits of high grade ore are frequently encountered but they are so intermingled with low grade deposits that crushing, roasting and concentration of all ore prior to its being charged into blast furnaces are necessary, states J. Joseph W. Palmer, of the iron and steel division, department of commerce.

Iron ore operations in Manchuria represent either Japanese or joint Sino-Japanese undertakings, under control of Japanese interests and lying within a zone protected by long term leases.

Less Ore Is Exported

At present, accordng to Mr. Palmer, seven blast furnaces having an annual capacity of 382,000 tons comprise the pig iron industry in Manchuria. An eighth stack was to be completed in 1930, but definite word is lacking.

With excellent coking coal nearby, the tendency is to export less ore and import less pig iron. From 1928 to 1930 exports of pig iron from Manchurian ports declined from 244,413 tons to 222,869 tons. Most of the iron exported was taken by Japan.

In 1928, according to a report by former Assistant Commercial Attache Ehlers, the cost of pig iron production in Manchuria was 24½ yen a ton, a yen normally being 50 cents. This figure included 10 yen for coke, 10 for iron ore, 2 for limestone and 2½ for miscellaneous costs, including labor. The total cost of Manchurian pig iron laid down at an important Japanese steelworks was 38 yen.

May Erect Steel Plant

A deterrment to the establishment of a steelworks in Manchuria in the past has been the fact that these works would be outside the limits of the Japanese empire and hence be subject to an export duty by China. Prior to the extension of Japanese influence in Manchuria, it was reported that a steel works would be erected either in Keroa or in the Kwantung Leased Territory.

In 1930, imports of iron and steel products into Manchuria totaled 2,019,992 piculs, equaling 119,937 gross tons. These imports were principally rails, iron and steel bars, black sheets and plates, galvanized sheets, tin plate, nails, castings and forgings. The 1930 imports were about 70 per cent of 1929.

Endows Plate Research

Lukens Steel Co., Coatesville, Pa., has established at the Mellon Institute of Industrial Research, at Pittsburgh, an industrial fellowship whose purpose is the scientific investigation of processes employed in the manufacture of steel plates. Erle G Hill, specialist in iron and steel technology and previously associate professor of metallurgy in the school of mines of the University of Pittsburgh, has been named fellow in charge of the investigation.

Order Steel by the Pound

NOT only in the stock market are new lows being made. Recently, a large eastern railroad placed an order for a steel spring, weighing 1 *pound and to be shipped by parcel post. The previous record low order for the manufacturer booking this order was* 12 *pounds.*

Forecasts Stainless Steel Third of All Produced

Chicago—In the next 10 years one-third of all steel production will be stainless steel, Joseph Petch, of the sales department of the Republic Steel Corp., forecast at a meeting of the Chicago chapter of the Institute of Scrap Iron and Steel, Dec. 16. He said that American industry is entering into an age of alloy steel and that the problems of the scrap industry will be intensified.

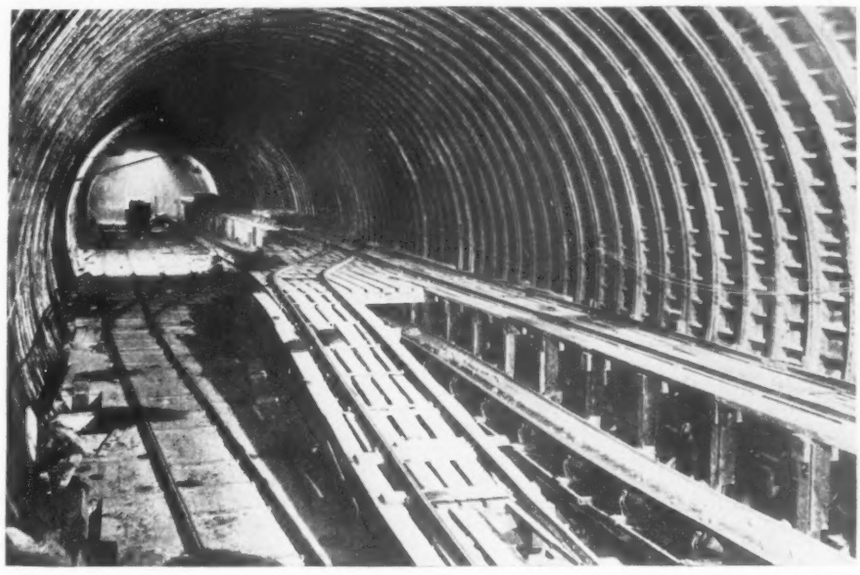
Ultimately, according to Mr. Petch, companies producing alloy steels will have to install special induction furnaces to enable them to use alloy scrap. Until then, segregation of the alloys will fall upon the scrap industry.

E. G. Howell, president of the chapter, presided. Benjamin Schwartz, director-general of the institute, spoke on market trends.

Sell 16,400 Tons of Scrap At Philadelphia, Jan. 6

Philadelphia—Bids on 16,400 tons of steel and nonferrous scrap will be taken at Philadelphia navy yard Jan. 6 in the dismantling of the U. S. S. FLORIDA.

Included are 10,000 tons of mild steel plates and shapes with some miscellaneous pipe, castings, forgings and sheets; 6000 tons of armor



Acme Photo

STEEL TRAFFIC TUNNEL PROGRESSES UNDER BOSTON HARBOR: The metal shell is approximately 100 *feet in circumference, made up of* 11 *segments, each* 9 *feet long. After each complete ring of steel is secured in place a coat of concrete is put on it, and below the finishing tiling on the upper portion this concrete is* 18 *inches thick. The tunnel, to be a mile long, and costing* $16,000,000, *is being constructed at the rate of* 15 *feet a day*

plate; and 400 tons of nonferrous metal scrap, largely brass and bronze castings.

Actual scrapping of the FLORIDA begins Jan. 25 and will be completed by October, 1932. The ship is being dismantled under the London naval treaty of 1930, though the navy will reserve for future use the main propelling machinery, gunnery-control apparatus, anchors and chain, auxiliary motors and pumps and most of the interchangeable ship fittings.

What's Happening In Business World

METALLURGICAL INSTITUTE of Leningrad claims to have produced a composition of aluminum and silicon through electrolysis of kaolin. The new composition, found useful in the automobile and aviation industries, is called silumin.

The Institute of Light Metals has worked out a process of covering sheet steel with aluminum on one side, calling this bimetal "ferran" and offering it as a substitute for tin plate, according to the soviet chamber of commerce, Moscow. Another bimetal is sheet steel covered with copper on both sides, providing a material for chemical and kitchen utensils.

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Relics of the forge at Valley Forge, Pa., near Washington's headquarters, have been unearthed and treated with preservatives prior to being returned to their original site.

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Distractions caused by noise add at least $375,000,000, possibly $500,000,000, to office payrolls annually, according to Dr. William Braid White, acoustics expert of the American Steel & Wire Co., Chicago.

Retail Food Prices Lower in November

Washington—Retail food prices in 51 cities, compiled by the bureau of labor statistics, showed an average reduction of about 2 per cent, Nov. 15, compared with Oct. 15, and a decrease of 17.5 per cent since Nov. 15, 1930. In all 51 cities from which the bureau obtains data food prices were lower in November than a year ago.

Exports and Imports Rise

Washington—Iron and steel imports increased in November. Exports at 59,556 gross tons compared with 59,335 tons in October. Imports at 34,658 tons contrasted with 29,401 tons and were the largest since July.

Make Half World's Rails; Fifth in Track Exports

Steel rails and railroad track material produced in the world in 1929 was about 7,000,000 tons, the United States producing 3,540,750 tons, of which 2,722,138 was rails, the remainder being rail joints and fastenings. As this is approximately half the world tonnage no other producer was measureably near in tonnage. Germany in 1929 produced 1,442,031 tons, France 751,520 tons, United Kingdom 730,500 tons.

While a leader in production, the United States was fifth in tonnage of exports of rails and track material. France was first in 1929 with something over 400,000 tons, Germany second with 390,000 tons, United Kingdom 387,000 tons, Belgium and Luxemburg 290,000 tons, and the United States fifth with 178,657 tons. Total world exports of this class of material was about 1,750,000 tons in 1929, according to J. Joseph W. Palmer, of the iron and steel division, department of commerce.

In 1930 South America took most exports in this line, 52 per cent, North and Central America and the West Indies 26 per cent and the Far East 17 per cent. For nine months of 1931 the Far East took first place with 39 per cent, North and Central America and the West Indies 36 per cent and South America 16 per cent. Track fastenings for the most part followed the same proportions as rails.

The trend toward taller and heavier equipment for deep well drilling is illustrated by the above silicon steel derrick, 178 feet high with base 32 feet square, mounted on a steel base substructure. Believed to be the tallest steel derrick, it was erected complete in 2 days by the International Derrick & Equipment Division of the International-Stacey Corp. of California for the Superior Oil Co., near Ventura, Calif.

Business Is Better

FEDERAL PRESSED STEEL CO., Milwaukee, specializing in production of automobile bumpers, has shown an increase of 100 per cent since October and is working 6½ days a week, maintaining night crews in two departments. Bookings on hand Dec. 15 will enable the company to maintain this schedule at least for 30 days. Increased orders are the result of delivery specifications from automobile factories for original equipment of bumpers and metal tire covers.

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Foundry of the LeRoy Plow Co., LeRoy, N. Y., has resumed on a 6-day week for an indefinite period.

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Edward G. Budd Mfg. Co., Philadelphia, estimates that its January payroll will total $800,000, compared with $429,000 in December.

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Muncie Foundry & Machine Co., Muncie, Ind., has increased its work week to 4 days, reinstating 50 per cent of its former employes.

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Mid-State Steel & Wire Co., Crawfordsville, Ind., has resumed production in two departments, with prospects of further increases early next year.

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Atlantic Foundry Co., Akron, O., reports inquiries steady and operations at 157 per cent of capacity, based on its monthly capacity of approximately 200 tons of castings.

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Gunite Corp., Rockford, Ill., manufacturing cast brake drums and general castings, is setting a high monthly record this month, having the largest working force in its history and operating Saturdays and Sundays.

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Eclipse Machine Co., Elmira, N. Y., subsidiary of Bendix Aviation Corp.,

South Bend, Ind., is expected to operate soon at capacity, with an additional force of 300 on its payroll. The subsidiary company produces the Bendix automobile starter drive and other automotive accessories. During the last 60 days, the company has contracted for more new business than in any full year in its history.

Sheet Sales and Output Slower in November

Sheet sales reported by the National Association of Flat Rolled Steel Manufacturers, Cleveland, averaged 3429 net tons daily in November, compared with 3780 tons in October. Production averaged 3425 tons; and shipments, 3166 tons, both lower than the daily output of 3959 tons, and shipments of 4173 tons in October.

Sales totaled 102,867 tons; production, 102,758 tons; and shipments, 94,975 tons in November. Unfilled tonnage as of Dec. 1 was 147,169 tons, compared with 159,367 tons Nov. 1. Total sheet capacity in the United States for November was 559,000 tons, and the capacity on which the foregoing figures are based was 385,500 tons.

Canadian 1930 Fabricating Business $28,055,783

Toronto, Ont.—A report by the dominion bureau of statistics shows that the value of work done in the bridge and structural steel industry in Canada in 1930 amounted to $28,055,783. There were 13 plants chiefly engaged in this industry, with a capital investment of $28,922,551, employing 4943 persons who received in salaries and wages $8,686,062. Cost of material was $12,549,435, and the value added by manufacture $13,506,348.

The principal items were bridges, 26,660 tons at $4,086,221; structural work, buildings, transmission towers etc., 124,146 tons at $14,775,652; plate and tank works, 4610 tons at $604,933; mechanical work, cranes, trolley, car unloaders, etc., 10,391 tons at $2,517,313.

More Sales at Lower Unit Cost New England Goal

Boston—More sales at lower unit cost per sale is the goal of New England manufacturers in 1932, according to first returns by the New England Council.

Early responses indicate that manufacturers will look more to better selling than production efficiency.

James W. Hook, president, Geometric Tool Co., Hartford, Conn., is chairman of the committee.

Post Rail Wage Cut Notices; Washington Business News

WASHINGTON — Although all western railroads and some in the East and South have started posting 30-day notices of a 15 per cent reduction in wages, the belief persists here that an early adjustment of the wage situation looking to a reduction of about 10 per cent effective early in January will be effected.

The 30-day notices are the formal inauguration of proceedings leading to mediation and insure against a loss of time in case present negotiations between committees representing railroad presidents and railroad labor organizations fail.

It is believed that while railroad labor will consent to an amicable adjustment there will be some trading. For one thing, labor appears determined that any savings from a wage cut in excess of amounts needed to meet fixed charges shall be used for providing further employment.

A. F. Whitney, president, Brotherhood of Railroad Trainmen, has announced his policy of fighting for a 6-hour day and a 5-day week at these negotiations.

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Recommendation of the Muscle Shoals commission that the plant be used for private rather than governmental operation has been submitted to congress by President Hoover.

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Only 5 per cent of our imports from Great Britain are affected by the new export tax, according to word in the hands of the state department.

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The tariff commission submitted to the senate Dec. 22 a report on copper production costs from 1928 to 1930, with no recommendations concerning the tariff. The report suggests that costs are more likely to increase than to decrease.

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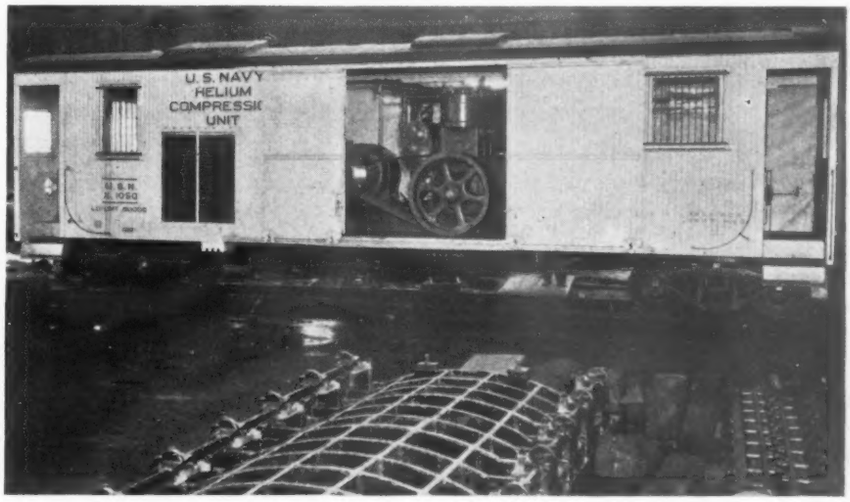
Debate over the moratorium on war debt payments effectually blocked any other remedial legislation prior to the Christmas holiday, but other relief measures are acquiring strength, especially the Reconstruction Finance Corp. bill. Hearings have been held before a senate subcommittee on banking and currency.

This measure, which would offer more liberal rediscount facilities than are now available at federal reserve banks, is expected to be of a special immediate benefit to the railroads. The subcommittee is expected to conclude its hearings in time for reporting the bill to the senate by Jan. 10.



DIRIGIBLES BRING STEEL EQUIPMENT INTO USE: In its issue of Dec. 21, page 15, STEEL illustrated a special steel tank car for carrying helium gas, ten cars being built for the navy. Now, it develops, two large high-pressure helium compressors have just been designed and constructed for the navy by the Hardie-Tynes Mfg. Co., Birmingham, Ala. One is to be mounted permanently at Lakehurst, N. J.; the other is to occupy a car, stationed at Amarillo, Tex. Helium is an expensive gas, that in the AKRON being valued at about $420,000. Should a navy dirigible be wrecked, this car would be rushed to the nearest point, the compressor and other equipment removed and conveyed to the spot to salvage the helium from one or all of the ship's compartments

Industrial Men in the Day's News

W. C. Heath, Vice President In Charge of Research Engineering and Plant Production, A. O. Smith Corp., Milwaukee

HIS business career of 22 years has been in various capacities with Fairbanks, Morse & Co.

NOW, at 44 he joins A. O. Smith Corp. as vice president of research engineering and plant production.

HIS new position will be to correlate the many activities of the Smith company.

W. C. HEATH who as noted in STEEL for Nov. 2 was assuming important executive duties with A. O. Smith Corp., Milwaukee, will be vice president in charge of research engineering and plant production for the Smith company.

Born in 1887 at Capron, Ill., a crossroads town in the corn belt of northern Illinois, engineering and mechanics first attracted Mr. Heath and he attended the University of Wisconsin in 1907, and afterward Lewis institute, Chicago. Fresh from the technical school classroom, he became a draftsman in the engineering department of Fairbanks, Morse & Co., Beloit, Wis., in 1909. During the period Mr. Heath was with the company it advanced to become a leading manufacturer of diesel engines, pumps and power house equipment. Today in Beloit, Mr. Heath has the reputation of being "a bug for research" and development.

In 1919 he was made superintendent of the Beloit works and in 1920, general manager. Six years later the other plants of Fairbanks-Morse in Three Rivers, Wis., Michigan and Indianapolis, now consolidated in Beloit, were put under his management. The title of vice president in charge of all manufacturing came to him in 1927.

Casual observation of the new executive at his desk in the Smith company's new administration building is that he does things without much talking. His position will be to correlate the many activities of the company.

AMBROSE SWASEY, surviving founder and present chairman of the board of the Warner & Swasey Co., Cleveland, celebrated his eighty-fifth birthday on Saturday, Dec. 19. This was the occasion of a luncheon in honor of Mr. Swasey, given by the officers of Cleveland chamber of commerce, the principal feature of which was the preliminary unveiling of a large oil painting of Mr. Swasey which later will be hung in the rooms of the chamber.

Among the 90 guests present were leading citizens of Cleveland, and many from out of town representing national engineering societies, leading universities, the machine tool industry and others.

Speakers included Randolph Eide, president of the chamber, who presided; Philip A. de Laszlo, London, England, who painted the portrait; Dr. Calvin W. Rice, New York, secretary, American Society of Mechanical Engineers; Dr. William G. Morgan, Washington; and Hon. James R. Garfield, Cleveland. Letters of congratulation were read, including those from President Hoover, Dr. Michael I. Pupin, John D. Rockefeller Sr., Sir Robert A. Hadfield, Charles E. Schneider and Charles M. Schwab. Mr. Swasey, who was deeply moved, responded in a manner most remarkable for a man of his years.

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L. S. Horner has been appointed vice president in charge of business promotion, Bullard Co., Bridgeport, Conn. He is at present a director of Niles-Bement-Pond Co., New York; Acme Wire Co., New Haven, Conn.; Burden Iron Co., Troy, N. Y. He was recently president of the Niles-Bement-Pond Co. in the reorganization and consolidation of its operations.

D. B. Bullard, mechanical engineer, and J. W. Bray, sales manager, have also been elected vice presidents of the Bullard Co., in charge of engineering and sales, respectively.

E. C. Bullard retains the position to which he was appointed earlier in the year, as vice president and general manager. E. P. Blanchard has been appointed sales manager.

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Cass E. Selden, formerly vice president, Ainsworth Mfg. Co., Detroit, will become associated with Edward G. Budd Mfg. Co., Philadelphia, and Budd Wheel Co., Detroit and Philadelphia, on Jan. 1. Mr. Selden was formerly president of the Joseph M. Smith Co., which was consolidated with the Ainsworth company in 1929. He will be located in Detroit.

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Fred Miick has been appointed engineer in charge of sewage treat-

ment plant equipment, Pacific Coast territory of Link-Belt Co., Chicago. He was transferred from the Philadelphia plant of Link-Belt Co., where he was in the engineering and sales departments for 21 years. His headquarters are in San Francisco.

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William B. Faulkner, traffic manager, Donner-Hanna Coke Corp., Buffalo, and George E. Griffiths, traffic manager, Carborundum Co., Niagara Falls, N. Y., have been elected directors of the Transportation club, Buffalo.

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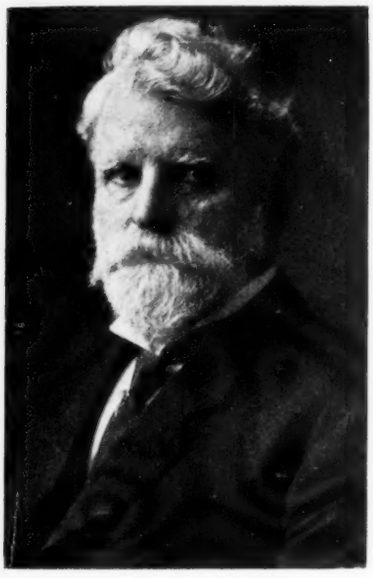
C. A. Anderson has been appointed general manager and R. C. Blair assistant sales manager, with headquarters at York, Pa., for Wright Mfg. Co., subsidiary of American Chain Co. Inc., Bridgeport, Conn.

Mr. Anderson was formerly sales manager for the Ford Chain Block Co., Philadelphia, and Mr. Blair was assistant sales manager at Bridgeport for the Wright Mfg. Co.

C. B. Veit, formerly with Yale & Towne Mfg. Co., Stamford, Conn., has



Ambrose Swasey

been made district sales manager for the Wright company at New York.

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Henry A. Taubensee has been appointed district sales manager in the Chicago district for Newton Steel Co., Detroit, with headquarters at 400 West Madison street, Chicago.

Mr. Taubensee was formerly general manager of sales for Superior Sheet Steel Co., Canton, O., and later vice president and general sales manager for Continental Steel Corp., Kokomo, Ind., from which later position he resigned in December, 1929. Prior to his present affiliation with the Newton company, he represent-

(*Concluded on Page* 46)

Obituaries

WILLIAM McLAUCHLAN, 81, a former partner in Pickands, Mather & Co., Cleveland, died at Cleveland, Dec. 22. Born at Cleveland in 1850 he started in the lake shipping business in 1873 with the Cleveland Iron Mining Co. Ten years later he joined Col. James Pickands and Samuel Mather, who were then forming the firm of Pickands, Mather & Co. He was head of the pig iron and ore department of the company and continued with the

William McLauchlan

firm for 35 years until he retired in 1918 as general partner. At that time he was succeeded as partner by his son, Jay C. McLauchlan, who died Oct. 8, 1929. As a tribute to Mr. McLauchlan Sr., in 1926 Pickands, Mather & Co. named their then largest ore carrier after him. Services were conducted for Mr. McLauchlan in Cleveland, Dec. 23.

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Horace W. Lash, 74, who was president of the Pacific Forge & Iron Co., San Francisco, died recently at San Francisco. He was well known in steel business on the Pacific Coast and in the Pittsburgh and Cleveland districts. He was born in western Pennsylvania and his first connection with the steel industry was in 1874, when he started with the Otis Steel Co., Cleveland. Under the direction of S. T. Wellman he received his early training in open-hearth steel practice. In 1876 Mr. Lash accepted a position with the Cleveland Rolling Mill Co., Cleveland, in charge of the open-hearth department and two years later went abroad to study European methods of making steel. During this time he met Sidney G. Thomas, London. He subsequently spent several months at Thy-le-Chateau, Belgium, in developing Mr. Thomas' process for the manufacture of basic open-hearth steel.

Mr. Lash became associated with Park Bros. & Co., Pittsburgh, after his return from Europe. It was under his management that the Carbon Steel Co., Pittsburgh plant was built. In 1901 he became one of the partners of the Garrett-Cromwell Engineering Co. and was connected with that firm until he moved to the Pacific Coast in 1914, when he formed the West Coast Iron Co., San Francisco, a plant with a 40-ton open-hearth furnace. He was president of that company until it was purchased by the Pacific Coast Steel Co., San Francisco, in 1918.

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Frank B. Robinson, 78, former

Horace W. Lash

president of the Carbon Steel Co., Pittsburgh, died at New York Dec. 17. Born in New York, where he was educated as an engineer, he reorganized and headed the Carbon Steel Co. from 1907 to 1910, when he retired to be succeeded by Charles McKnight. He remained a director of the Carbon company until 1914.

Before entering the steel business Mr. Robinson was an active member of the New York Stock exchange. With D. O. Mills, Gen. John G. McCullough and other New York partners he later attracted attention in the steel industry by taking government contracts for battleships, including the U. S. S. Oregon. Closely

(*Concluded on Page* 16)

MIRRORS of MOTORDOM

DETROIT

IT SEEMS established beyond doubt that Ford Motor Co. has decided on the production of an eight, but up to Christmas no steel mill had benefitted from this decision.

Quantity steel tonnages are extremely scarce in Detroit. Not only is Ford's purchasing department relieved of signing large steel contracts, but others as well are showing no disposition to buy in quantity as 1931 runs its final course.

Yet, a rising trend in assemblies is discernible. November produced only 65,000 automobiles. December no doubt accounted for a few more and January doubtless will continue the gain. Probably November will stand as the low point.

Chevrolet now has 34,000 employes working 4 days, 4 nights; Buick, instead of closing over the holidays, tarried only for Christmas day and the day following; Studebaker and Willys-Overland schedules expanded sharply last week.

Though no final assemblies of the new Ford have been made in quantity, moderate banks of parts from new motors to the smallest bolts are ready at Dearborn.

Because outside parts manufacturers have not received the releases anticipated, this further indicates that delays are still encountered at the Dearborn plant. Partsmakers will get the word to go only when the Ford plant itself has worked out the final design.

Even the Murray Body frame plant at Ecorse, set up to run off Ford frames, has not produced anything but experimental frames to try out dies.

Make 2000 Bodies Daily

Though no official tabulation is available until Dec. 31, Chevrolet sales are reported to be outrunning the same period of 1930.

Chevrolet's Fisher Body plant at Cleveland has apparently hit its stride, Last week it was turning out close to 2000 body jobs daily. These are being distributed to the various Chevrolet assembly plants over the country.

Actual assemblies of Chevrolet at Flint, Mich., also have been increased over the week prior. Material on hand, including steel, have gained in volume from the delivery stringency recently. Flint plant assemblies of finished Chevrolets have been near 650 a day, 4 days.

Cadillac Out Jan. 2

Fisher at Cleveland is also making dash boards and cowls for other General Motors lines. Some of the Olds body work is being done there.

Cadillac-LaSalle will be announced Jan. 2.

Over 20 body styles on the Cadillac eight alone will be presented as standard, and the twelve and sixteen will offer a number of body styles from which to chose.

In keeping with General Motors' swing in design this year, Cadillac, too, will have the visorless, slanting windshield, a greater flare to the rear fenders, and the dash board refinements that Buick brought out, including the parcel receptacle.

The Cadillac radiator grille is built into the radiator shell instead of being detachable as at present.

Cadillac and LaSalle are reported to have spent nearly $6,000,000 in preparation for these models. All of the 1932 Cadillacs and LaSalles are going to be offered at reduced prices.

Cadillac's plant continues to hum. Stepped up from about 30 cars a day, 5 days, for all models two weeks ago, last week assemblies touched the 400-unit mark for the week, or nearly 80 cars a day.

Olds has not yet shown regular production. However, employment at almost the 2000 mark has touched a 1931 high and plant activity is centered on the production of the first 1932 models.

Willys-Overland has given 10 per cent salary increases to about 1000 office workers earning less than $100 a month. . . . All Buick bodies formerly exported from Lansing, Mich., for Canada will be made at the company's plant, Oshawa, Ont. . . . Cadillac-LaSalle invited over 800 dealer representatives to Detroit recently. . . . About 1000 models from the Willys-Overland plant for dealer outlets were recently driven away in one day. . . . Ford's wide-world production has not topped 760,000 units so far in 1931, whereas in the same time of 1930 it was over 1,450,000. . . . The final curtain has not yet been rung down but to Plymouth and Auburn-Cord must go 1931 production laurels. The former has produced over 110,000 cars for 1931 against 55,000 in 1930; the latter 35,000 models for 1931 and 12,500 in 1930.

Obituaries

(*Concluded from Page* 15)

related to the Pennsylvania Steel Co., Harrisburg, Pa., Mr. Robinson supplied the steel for the Brooklyn bridge and later, from his own works, steel for the Manhattan bridge.

□ □ □

Samuel R. Barcroft, 87, one of the pioneers of the oil industry and at one time associated with Andrew Carnegie in founding the Hazelwood Oil Co., died at Bradford, Pa., Dec. 18.

□ □ □

J. W. Schatz, 56, president of the Federal Bearings Co., Poughkeepsie, N. Y., Schatz Mfg. Co., West Poughkeepsie, N. Y., and Waterbury Steel Ball Co., Waterbury, Conn., died at Poughkeepsie Dec. 20. Mr. Schatz is survived by two brothers, Grover and Herman, associated with him in business.

□ □ □

Thomas W. Dawson, 55, vice president, H. C. Frick Coke Co., Pittsburgh, died Dec. 19 at Scottdale, Pa.

Born in Helfenstein, Pa., in 1876, Mr. Dawson was associated with the Frick company for 30 years, formerly serving as chief engineer at the Scottdale plant.

□ □ □

Alonzo Aldrich, 72, president of the Beloit Iron Works, Beloit, Wis., died at Cleveland, Dec. 20.

□ □ □

Joseph A. Simonton, 71, retired steel broker, died Dec. 20 at Aspinwall, Pa. He was born in Pittsburgh and formerly was identified with the Carnegie Steel Co., Pittsburgh, and the Union Drawn Steel Co., Beaver Falls, Pa., in sales capacities. Before he retired in 1925, Mr. Simonton maintained a steel brokerage office in Pittsburgh.

□ □ □

Knowlton L. Ames Sr., 62, Chicago, chairman of finance committee, Murray Corp. of America, Detroit; director of American Steel Foundries, Chicago, and chairman, Booth Fisheries Co., Chicago, died in Chicago, Dec. 23. He was owner of the *Chicago Journal of Commerce*, of which his son, John D. Ames, is publisher. Another son, Knowlton Jr., is publisher of the *Chicago Evening Post*. Mr. Ames Sr. formerly was active in development of the Griffin Wheel Co. Ltd., Chicago.

□ □ □

Brynmoor Hill, general manager, Grovesend Sheet & Tin Plate Co., Swansea, Wales, died Dec. 17. Mr. Hill also was a director of the Richard Thomas Co., largest Welsh maker of tin plate. He was an outstanding figure in the British iron and steel industry. Mr. Hill frequently visited this country where he had a number of warm friends, particularly among the executives of the sheet steel industry.

Tool Builders Decide To Hold Show in 1932

Decision that a machine tool exposition would be held in 1932 has been reached by the National Machine Tool Builders' association, the sponsoring body. This show, the third of its kind, has been scheduled for Sept. 10-17 in Public Auditorium annex, Cleveland, where the two previous expositions were held.

Meeting in Cincinnati, Dec. 18, the exposition committee of the association made assignment by drawing 61,000 square feet of display space to 110 member exhibitors. It is believed likely that the 1932 show will exceed in size the 1929 show.

Pennsylvania railroad has awarded 450 tons of tunnel bolts for Baltimore, the largest contract in this market in many weeks.

Here and There in Industry

WISCONSIN Art Bronze & Iron Co., 247 East Keefe avenue, Milwaukee, and Badger Iron & Wire Works, 2933 West Cleveland avenue, Milwaukee, have been consolidated and the latter will carry forward the output of both concerns. W. C. Schmeling, president of the former, will be general manager. Albert Haeger is president of the Badger company.

□ □ □

Welding & Motor Parts Co., Erie, Pa., has taken over the Trojan Mfg Co., of the same city, and has moved its equipment to its own plant. R. A. Williamson is general manager.

□ □ □

Gough Engineering Co. Ltd. Hamilton, Ont., has been formed to take over the business and plant of Bailey & Gough, which has been in existence for about 12 years.

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Hardie Tynes Mfg. Co., Birmingham, Ala., has shipped the last two of 18 sluice gates for the New York city water supply system. The gates weigh 15 tons each and are built up of steel, iron and bronze.

□ □ □

Superior Construction Equipment Co., Chicago, distributor for the Byers Machine Co., Ravenna, O., manufacturer of cranes and shovels, has opened a branch office at Indianapolis, in charge of R. D. Abrell, district manager.

□ □ □

Dominion Foundries, Tweed, Ont., has been incorporated under the name of Tweed Foundries Ltd., and the business will be carried on without further change. In addition to production of plow points, hydraulic pumps for pump bodies and electric house pumps the company operates a machine shop.

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Detroit Gear & Machine Co., Detroit, division of the Borg-Warner Corp., Chicago, has renewed its contracts with several large automobile companies for standard equipment parts for the coming year. The company shortly will introduce three free wheeling appliance models and one new transmission.

□ □ □

J. F. Corlett & Co., Cleveland, representing Lukens Steel Co., Coatesville, Pa., Alan Wood Steel Co., Conshohocken, Pa., and Franklin Steel Works, Franklin, Pa., among other accounts, are moving their offices from the sixteenth floor of the Union Trust building to the twelfth floor of the Citizens building, Cleveland, effective Jan. 1.

□ □ □

Rosco Mfg. Co., Minneapolis, recently organized and incorporated, has moved into its new plant at 3128 Snelling avenue south. It will manufacture a bituminous distributor with special 7-way valve, a folding spray bar and other equipment. Thorman W. Rosholt is president, R. S. Rosholt vice president, and J. A. Miller secretary.

□ □ □

Smith Welding Equipment Corp., 2633 Fourth street southeast, Minneapolis, manufacturer of welding equipment and gas supplies, has completed a program of expansion costing about $50,000. A compressor with daily capacity of 19 tons of liquid air has been installed and a new type of liquefying column. Elmer E. Smith is president.

□ □ □

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and the Westinghouse Electric International Co. announce that they have concluded with Eroole Marelli & Co., Milan, Italy, a leading Italian electric manufacturing concern, an agreement for an exchange of patents and experience. The Westinghouse companies do not participate financially nor take any part in the management of the Italian company.

□ □ □

Minnesota Electric Lamp Co., Minneapolis, recently organized, has established a plant at 428 Stinson boulevard, in a building of the Northwestern Terminal Co. Production has started on electric light bulbs for automobiles and later this will be extended to a complete line of bulbs and radio tubes. H. Backenheimer is president, G. M. Lesher vice president, A. H. Clague secretary-treasurer, and R. H. Lesher general manager.

□ □ □

Asano Dockyard Co. of Japan has bought from the Lincoln Electric Co., Cleveland, a complete equipment for manufacturing large diameter steel pipe by its process of automatic welding in a shielded arc. Installation will be in charge of T. Y. Inagaky, Tokyo representative of the Lincoln company. This is the second order in six months from Japan for a pipe plant installation of this kind.

EDITORIAL

Steel Always Has Come Back Strong

IN FOUR more days 1931 will have passed into history. Not in many years have business men been so anxious to see the old year fade from view. There is a disposition to feel that no matter what the new year may bring forth, life under its banner will be preferable to the ordeals of the past 12 months.

This attitude is not original with the present generation of executives. The same thought has been expressed at the end of every dark year in the history of business. The urge to start afresh—to have a new deal is as old as time itself.

Conditions in the depression of 1893 and 1894 were similar in many respects to those of the present period. That sentiment then did not differ much from that of today is illustrated by the following excerpts from an editorial in the Jan. 4, 1894, issue of *Iron Trade Review*, predecessor to STEEL:

"There will be no regret in the iron trade at parting company with 1893. There is some satisfaction in the thought that the record of a bad year is a closed book and that a clean page has been turned that is unblurred by disaster.

"There has been so much hoping for better things, all hanging on the arrival of the new year, that the business world is in a mood to discover signs of betterment. . . ."

Conditions in 1893-1894 Similar To Those of Present Period

Reading further it is apparent that the burden of complaint at the end of 1893 rested upon the same difficulties which afflict us today:

"The pig iron history of the year may be comprehended in an output of 4,562,918 gross tons in the first six months, and a falling off of 60 per cent in the second six months.

"Billets at $16.40, Pittsburgh, bar iron at 1.25c, mill, and beams at 1.40c are other bottom points in price schedules that will make the year stand out sharply against the background of those that preceded it."

Then as now the railroads were in trouble. According to *Iron Trade Review's* market summary, "The recent receiverships (of railroads) may even help the rail mills. . . . When a court takes hold renewal needs, long imperative, are attended to and there is no trouble about pay."

Then as now there was a loud clamor for a revision in the tariff. "The eve of a revolution in tariff policy has never been a time of expansion, and the sort of recovery the optimists are looking for will not come until the people . . . recall the decree (tariff) they are said to have made in 1892."

But above all of these problems was that of money. Andrew Carnegie wrote to the editor of *Iron Trade Review* in part as folows:

"The Sword of Damocles hangs over every phase of business in the United States. That sword is silver. We never can have permanent and genuine prosperity without first settling the standard of value. At present capital, not only at home but throughout the world, is alarmed."

Each time some one says that the current period is different than anything that has gone before. There are differences, but in general the fundamental characteristics are common.

This being true, is it not safe to say that the United States will find its way out of the present situation just as surely as it always had in the past?

Decline in Annual Steel Output Never Has Extended Beyond Two Years

It may surprise many readers to know that from 1885 to date declines in the annual production of steel ingots and castings in the United States never have extended beyond two consecutive years. Only four times in the last 46 years have losses been sustained beyond one year. A decline in 1903 was followed by another in 1904; consecutive drops occurred again in 1907 and 1908, in 1918 and 1919 and in 1930 and 1931. In 1905 production much more than regained its losses of 1903 and 1904. In 1909 the declines of 1907 and 1908 were recovered with a large margin to spare. A sharp comeback was staged in 1920 but it was not until 1925 that the high output of 1917 was again exceeded. However, the intervening years (with the exception of 1921 and 1922) were years of high output.

The tendency to come back strong also is manifested in the record of pig iron production. Since 1867 consecutive declines for three years have occurred only in 1874, 1875 and 1876 and in 1883, 1884 and 1885. Consecutive drops for two years are recorded only in 1893 and 1894 and in 1930 and 1931. Here again the pronounced rise in output following a prolonged recession is marked.

To those who are inclined to take too literally the views of alarmists to the effect we are in for a long period of forced inactivity, we recommend a study of the production record of iron and steel. On the basis of past performances in half a century, the industry is due for a striking comeback in the next few years.

THE INDUSTRIAL DIAL

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The Business Trend Section of STEEL

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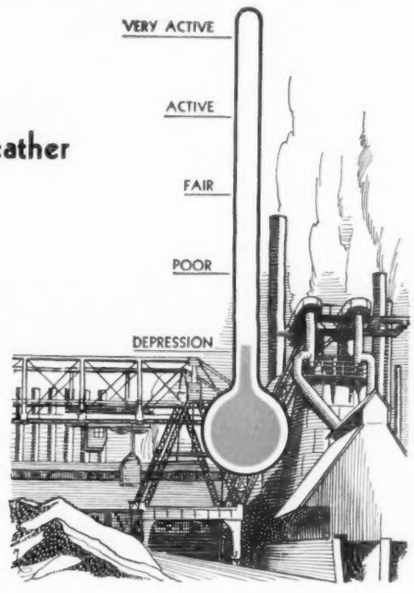
MONTHLY reports of industrial activity in November tend only to emphasize the accelerated slide of business into the usual year-end depths. Steel ingot production showed a slight gain, thanks to a freakish spurt in bessemer steel, but pig iron, automobile output, building awards, car orders, revenue freight car loadings, foreign trade and most of the other barometers of activity decline. Indexes of prices also continued their downward trend.

Where Business Stands

Monthly Average, 1930—100

	Nov., 1931	Oct., 1931	Nov., 1930
Steel Ingot Output	49.9	46.3	69.4
Pig Iron Production	42.7	43.8	72.1
Freight Movement	74.5	79.9	90.8
Building Construction	48.2	72.2	77.8
Automobile Output	22.2	27.8	48.3
Wholesale Prices	73.6	75.3	91.5

Industrial Weather



TREND:

Unsettled

In spite of the somber aspect of current statistics, business leaders have been able to find an occasional bright spot. The recent slight upturn in copper prices reflected progress in working out the serious problems of that industry. The railroad wage question seems nearer settlement, with a badly needed reduction in prospect.

The automobile industry still is lagging behind expectations. Thus far the usual seasonal upturn has been slow in starting.

Commodity prices continue downward, Bradstreet's average for 1931 being $8.76 against $10.75 for 1930. STEEL's composite of steel and iron prices has established an average of $31.15 for the current year as compared with $33.52 in 1930. Part of the confidence that should arise from the apparent steadiness of steel prices throughout the year is shaken by the signs of renewed weakness present in the year-end market situation.

The Barometer of Business

Industrial Indicators

	Nov., 1931	Oct., 1931	Nov., 1930
Pig iron output (Daily average, tons)	26,727	37,831	62,128
Machine Tool Index	50.4	57.4	95.5
Unfilled orders (tons)	2,933,891	3,119,430	3,639,636
Ingot output (Daily average, tons)	63,747	58,977	88,489
Dodge Bldg., awards in 37 states (sq. ft.)	20,519,300	30,700,200	33,098,600
Automobile output	65,000	81,582	142,022
Coal output, tons	30,020,000	35,700,000	37,021,000
Business failures; number	2,195	2,362	2,031
Business failures; liabilities	$60,659,612	$70,660,436	$55,260,730
Cement production, Bbls.	8,161,000	10,762,000	11,098,000
Cotton consumption, bales	428,870	462,025	415,315
Car loadings (weekly average)	654,926	762,631	797,808

Foreign Trade

Exports	$193,000,000	$204,895,000	$288,978,000
Imports	150,000,000	168,708,000	203,593,000
Gold exports	4,994,000	398,604,000	5,008,000
Gold imports	94,430,000	60,919,000	40,159,000

Financial Indicators

	Nov., 1931	Oct., 1931	Nov., 1930
25 Industrial stocks	$148.43	$146.56	$228.21
25 Rail stocks	$41.22	$44.72	$91.12
40 Bonds	$72.22	$72.38	$84.65
Bank clearings (000 omitted)	$23,769,391	$32,079,120	$35,682,512
Commercial paper rate N. Y. (per cent)	4	3½	3
*Commercial loans (000 omitted)	$7,574,000	$7,624,000	$8,766,000
Federal Reserve ratio, per cent	65	67.1	81.7
**Railroad earnings	$64,020,077	$55,318,586	$112,251,002
Stock sales, N. Y. stock exchange	37,368,728	47,895,000	51,949,840
Bond sales, par value	$232,514,000	$346,979,000	$187,205,700

*Leading member banks Federal Reserve System.
**October, September and October respectively.

Commodity Prices

				1913
STEEL's composite average of 14 iron and steel prices	$30.61	$30.74	$31.92	$26.32
Bradstreet's index	$7.91	$8.09	$9.84	$9.21
Wheat, cash (bushel)	75c	51c	97c	92c
Corn, cash (bushel)	55c	54c	90c	51c
Petroleum, crude (Bbl.)	75c	60c	92c	$2.50

Thumb Nail Sketches Of Business

Galvanized Pails Ahead of Last Year

One of the few manufactured articles of steel to show a gain in 1931 is galvanized pails and tubs. The average monthly output for 10 months of this year is 118,700 dozens, compared with 116,200 dozens in the corresponding period of 1930.

High and Low Steel Ingot Averages

Indicative of the unbelievable low point touched by steel ingot production, the daily average for 1931 will prove to be decidedly farther below the average for the last 10 years than the high average of 1929 was above it. In 1929 the daily average was 31.8 per cent above the 10-year average. The 1931 daily average will fall about 39.3 per cent below it.

Dividends in 1932

Col. Leonard P. Ayres predicts that by the end of 1932 dividends will be lower than in 1931, commercial failures will be greater in number, wage rates will be lower, but the number of persons employed will be greater.

Cost of Living Down

According to compilations of the National Industrial Conference Board, the cost of living index (1923 = 100) stood at 84.9 in October. The lowest item embraced in the index is housing at 80.3. Fuel and light at 90.5 and sundries at 94.6 were the highest items.

Equipment Orders Fluctuate Sharply

Orders for machine tools and foundry equipment have varied within a wide range in the first 11 months. Both indexes are on the basis of 1922-23-24 as 100. The machine tool barometer touched 117.6 in March and 44.5 in October. The foundry equipment index established a high for 1931 at 174.4 in March and lows of 16.9 in August and 17.2 in November.

Business Trend Charts of the Month

Production

Steel ingot production	Dec.	14,	p. 27
Pig iron production	Dec.	14,	p. 28
Blast furnace production rate	Dec.	21,	p. 28
Industrial production	Dec.	7,	p. 27
Bituminous coal output	Dec.	21,	p. 30
Coke production	Dec.	21,	p. 29

Demand

Unfilled orders, U. S. Steel Corp.	Dec.	21,	p. 27
Railroad car orders	Dec.	21,	p. 28
Index of machine tool orders	Dec.	28,	p. 22
Index of foundry equipment orders	Dec.	28,	p. 21
Building construction	Dec.	28,	p. 22
Steel Castings, orders	Dec.	21,	p. 29
Structural steel sales	Dec.	14,	p. 29
Automobile production	Dec.	7,	p. 30
Steel sheets, orders	Dec.	7,	p. 28

Prices

Iron and steel price parity	Dec.	7,	p. 30
Bradstreet's index of commodity prices	Dec.	14,	p. 29
Iron and steel price index	Dec.	28,	p. 21
Basic pig iron—heavy melting steel	Dec.	21,	p. 30

Miscellaneous

Foreign trade	Dec.	28,	p. 20
Freight traffic	Dec.	7,	p. 29
Commercial failures	Dec.	14,	p. 28
Iron and steel imports and exports	Dec.	7,	p. 29
Monthly railroad earnings	Dec.	7,	p. 28

U. S. Foreign Trade Drops Again; Imports Lowest in Year

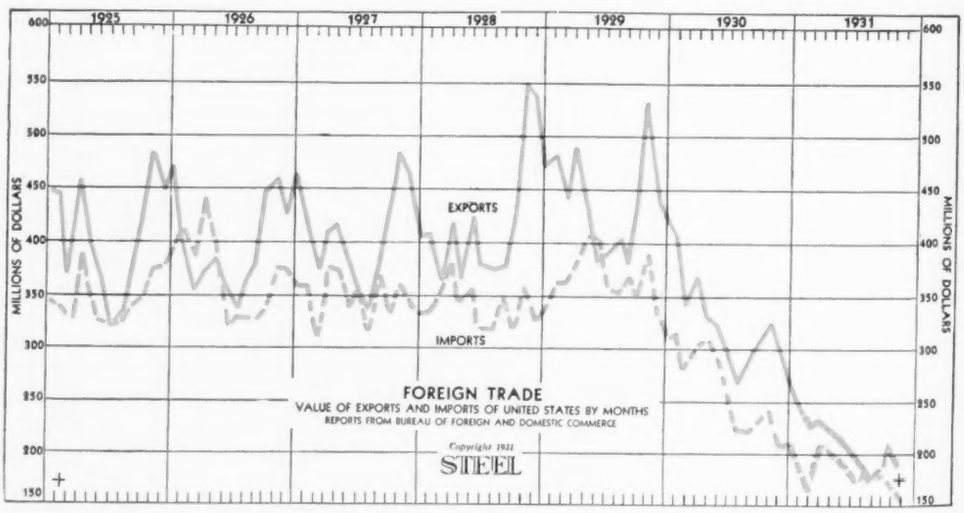
Merchandise exports and imports of the United States in November dropped moderately from October levels. According to the bureau of foreign and domestic commerce, exports in the eleventh month were valued at $193,000,000 and imports at $150,000,000. The excess of exports over imports is the greatest in any month since February—a rather odd situation in view of the fact that only four months ago imports surpassed exports. Prior to the crash in world trade late in 1929 exports usually reached their highest peak of the year in October but in the depression years of 1930 and 1931 the highest points were established in the spring months.

EXPORTS

Nov., 1931	$193,000,000
Oct., 1931	204,895,000
Nov., 1930	288,978,000

IMPORTS

Nov., 1931	$150,000,000
Oct., 1931	168,708,000
Nov., 1930	203,593,000

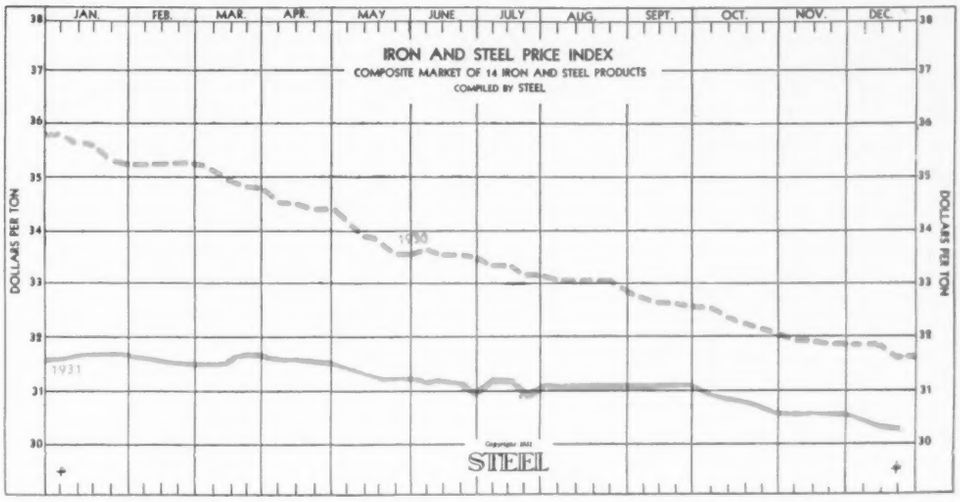


Monthly Averages

Nov.	$30.61
Oct.	30.74
Sept.	31.03
August	31.05

Weekly Index

Dec. 19	30.28
Dec. 12	30.36
Dec. 5	30.47
Nov. 28	30.55
Nov. 21	30.63
Nov. 14	30.63
Nov. 7.	30.63

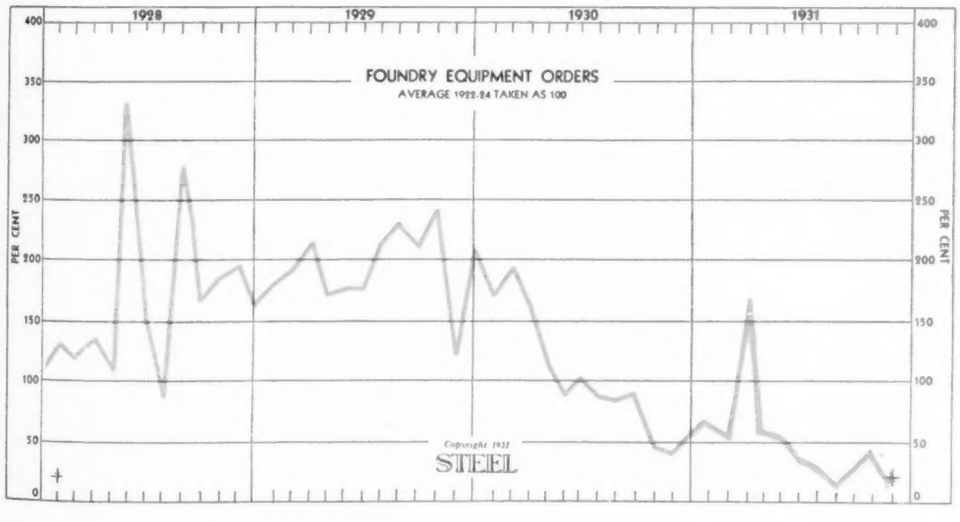


Price Composite Drops Less Than 5 Per Cent in 1931

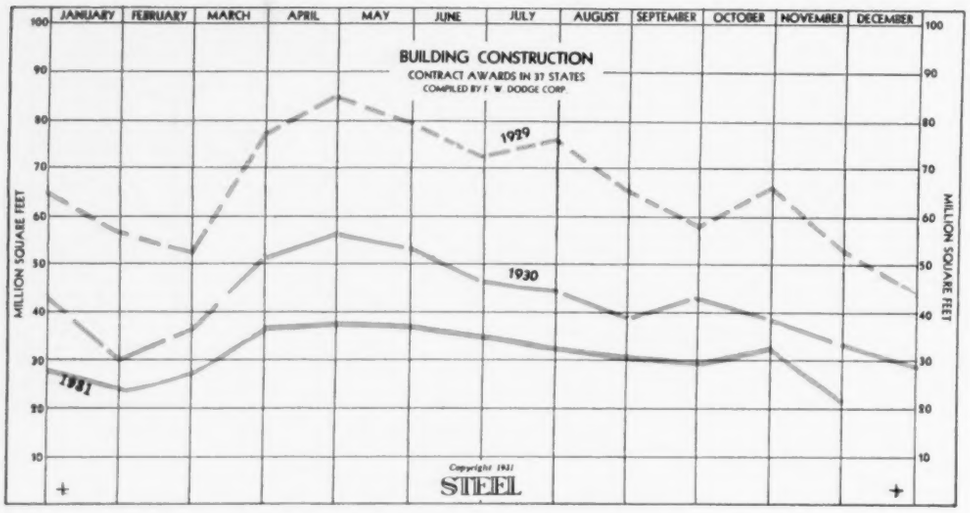
In spite of a more noticeable downward drift in the final quarter STEEL's composite of 14 prices of steel and iron products closes the year with a relatively small loss. In 1930 the composite stood at $35.88 in the first week of January and at $31.66 on Dec. 31. This was a loss in 12 months of $4.22 or 11.7 per cent. The corresponding decline in the year now closing is less than 5 per cent, indicating that the downward pace slowed considerably during the past 12 months. This comparison must be interpreted as a most favorable sign, yet part of its force is lost in the present unsettled state of prices.

Foundry Equipment Orders Suffer Relapse in November

After an encouraging spurt in September and October the index of foundry equipment orders in November suffered a relapse which carried it down almost to the low point of August. According to the report of the Foundry Equipment Manufacturers' association returns from 17 firms showed orders in the eleventh month at the index number of 17.2 compared with 45.9 in October. The index for shipments was 32.9, a gain over 26.2 in the previous month. Unfilled orders stood at 40.8, a drop from October. The high point for the year in new orders was 174.4 in March and the low point 16.9 in August. Average for 11 months is 54.2.



	1931	1930
Nov.	17.2	45.3
Oct.	45.9	50.0
Sept.,	31.9	91.0
Aug.	16.9	85.2
July	38.7	90.6
June	40.9	102.1



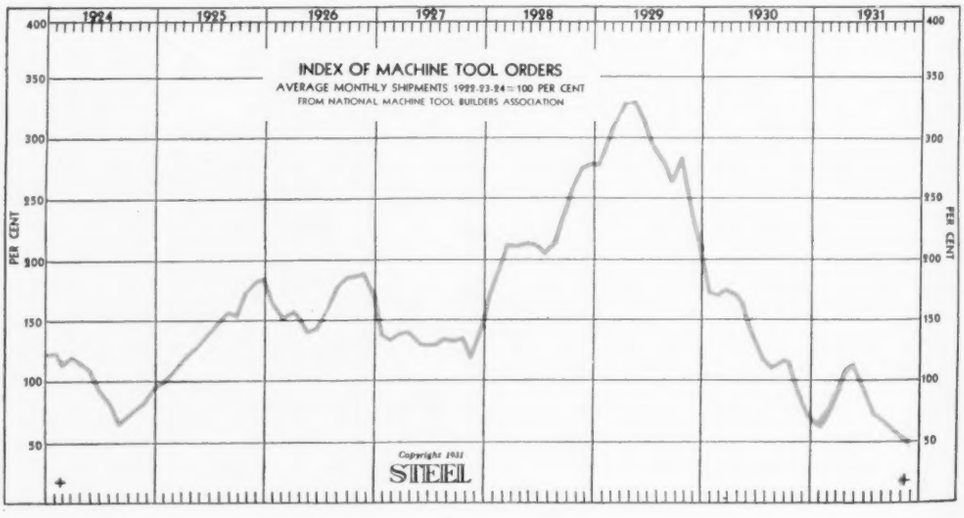
	Square Feet
Nov., 1931	20,519,300
Oct., 1931	30,700,200
Nov., 1930	33,098,600

Building Awards in November Sink To Lowest Point of Year

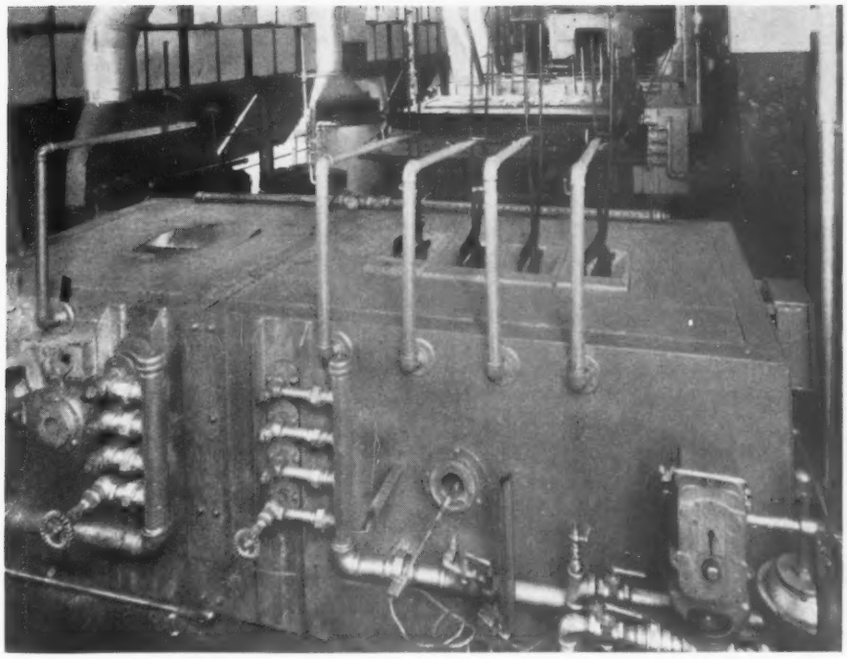
Following three months almost devoid of fluctuation, the volume of building construction as measured by awards in 37 eastern states reported to the F. W. Dodge Corp. in November dropped sharply. In August, September and October the total contracts hovered around the 30,000,000 square foot mark. In November the total was only 20,519,300 square feet. Residential construction accounted for 10,958,300 and industrial work for 1,123,200 square feet of the total. November volume was the lowest in any of the 11 months of the year. The peak, 39,380,000 square feet, was established in April, since which time the trend has been gradually downward to the current level.

Machine Tool Orders Gain But Moving Average Drops

While an improvement in the index of gross orders for machine tools was noted in November, the rise from 44.5 in October to 50.8 in the eleventh month was not enough to lift the three months' moving average above last month's level. The current report of the National Machine Tool Builders' association shows the moving average stood at 50.4 for November as against 57.4 in October. This is the lowest point touched by the moving average in 1931. The peak was 103.3, registered in May. In November the index of shipments fell sharply from 84.6 to 49.9 but the index of unfilled orders rose slightly from 96.5 to 97.3. In November last year the moving average was 95.5.



	1931	1930
Nov.	50.4	113.3
Oct.	57.4	113.3
Sept.	63.1	113.6
August	68.9	110.2
July	74.1	117.3
June	88.6	146.7
May	103.3	165.1



WORK being introduced into the preheat chamber of the combination preheat and high-heat furnace. High-heat chamber is shown at the left

Heat Treating Modern Twist Drills

BY J. B. NEALEY

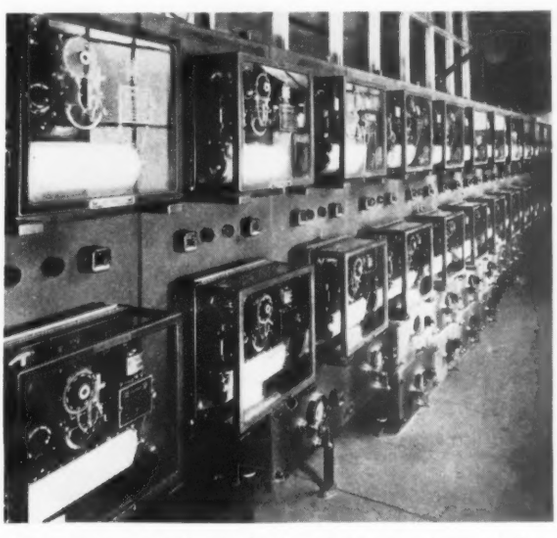
PROBABLY no tool is called upon for more exacting service than is the twist drill, and utmost care must be exercised in selection of steel, in design and in heat treatments used in its manufacture. Development of the drill started with the flat type and progressed on through the flat twisted form, the spiral milled drill and finally to the hot forged drill. More recently another method has been put into use, consisting of hot twisting the drill into shape from rolled profile or grooved stock.

The latter method was developed by Whitman & Barnes Inc., Detroit, manufacturer of all types of cutting tools including drills, reamers, milling cutters, end mills, counterbores, saws, interchangeable punches, etc. In addition to the Detroit plant a branch is operated in Canada, and the company is rated as one of the largest manufacturers of this line of products in the world.

Two grades of steel are used generally in twist drills manufactured by this company. One is a high-speed steel of the following approximate analysis: Carbon 0.70, sulphur 0.015, phosphorus 0.015, silicon 0.20, manganese 0.25, chromium 4.00, tungsten 18.00, and vanadium 1.00 per cent; the second is a carbon steel analyzing about as follows: Carbon 1.25, sulphur 0.015, phosphorus 0.015, silicon 0.20, and manganese 0.20 per cent.

Drills ½-inch and larger are made from grooved stock rolled at the mill under controlled temperatures, to the manufacturer's own specifications. This bar stock is 8 to 12 feet long and is annealed thoroughly at the mill by packing in pipes in a mixture of charcoal and ashes.

Annealing temperature is 1650 degrees Fahr. and the stock is soaked at this heat for from 8 to 12 hours, after which it is allowed to cool in the furnaces for 24 hours. Round carbon steel stock is normalized at the mill



Automatic control of time and temperature of heat treating operations is provided by this battery of recording pyrometers

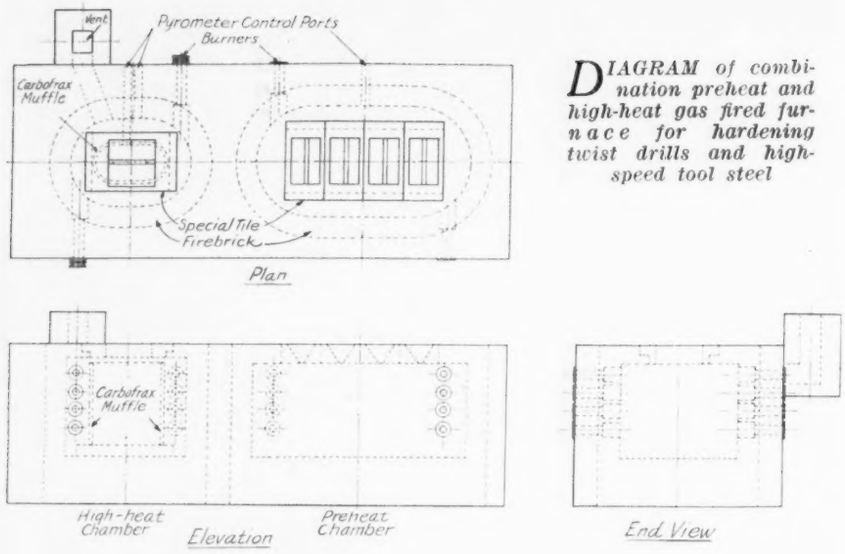


DIAGRAM of combination preheat and high-heat gas fired furnace for hardening twist drills and high-speed tool steel

at 1700-1750 degrees Fahr., reheated for the anneal to 1450 degrees Fahr. and then allowed to cool in the furnace.

The Whitman & Barnes heat treating division is equipped with a battery of furnaces, lead pots, salt baths, etc., all controlled from a separate control room fitted up with a panel containing recording pyrometers arranged in two long rows, as shown in an accompanying illustration. Time clocks for regulating the heat treating periods also are arranged on this board. Heating periods for the various furnaces are set on these clocks and at the termination of a period the clock causes a green light to flash and an alarm to sound at the furnace. In addition, each furnace is equipped with a standard on which are mounted three other lights —red, white and blue—lighted automatically by the controllers to designate to operators whether temperatures are too high, correct or too low, respectively. The green light with the alarm is also on this standard.

Combination Furnace Used

A distinctly new type of furnace for hardening drills and other high-speed tools is in use. It comprises two units, one for preheating and the other for the high heat. There are several of these furnaces, heated by gas, because of its economy and ease of control, both as to temperature and atmosphere. The furnaces are box-like in construction with rounded ends, are built of firebrick, suitably insulated, and are charged through the top. A carborundum muffle sets in the high-heat furnace and the work is introduced into this through a slit in the top. The preheat furnace is semi-muffled. An accompanying illustration and diagram show details of this combination unit.

The preheat furnace is four times the size of the high-heat furnace, since it takes approximately four times as long to preheat as it does to bring the work up to temperature in the high-heat furnace, thus necessitating a 4 to 1 ratio in physical capacities. Heat is supplied to both furnaces through two vertical rows of gas burners each. These burners are set in the outer wall on opposite corners and fire tangentially against the inside of the wall and between it and the muffle. There are four burners in each row, said to assure complete circulation and heat distribution.

At the rear of the furnace is a duct and flue through which waste products of combustion are exhausted to the atmosphere. Resting on the front edge is an air pipe in which is drilled a line of holes through which air is forced to drive the heat, rising through the charging slits, back into a hood so as to increase the comfort of workmen around the furnace. The heat control instrument, in each instance, is attached to a motor operated valve in the gas supply line which is bypassed. In the closed position the bypass lets almost enough fuel through to maintain the furnace at the correct temperature, thus minimizing the periods of full fuel flow. This makes for fuel economy and greater sensitivity in control.

Several standard box-type gas-fired furnaces are operated, ranging in size from 4 feet square up to 6 feet in length. They are heated with six gas burners each, arranged three on a side, and firing under the hearth. One manifold and one automatic controller are sufficient for the six burners and base metal thermocouples are employed. In the plant are also several electric furnaces in which gas is used to produce the correct atmosphere.

Close laboratory control is maintained on products from beginning to end, including analysis of stock, hardness tests, examination of the microstructure and fracture in the annealed and hardened states, hot etched tests, etc. Some of these tests are applied after the tools are heat treated and finished, and in addition certain sizes are subjected to actual drilling or cutting tests.

Complete Records Kept

Careful and complete records are maintained. Each lot of steel is given a number on arrival and this number follows each tool made from it right through the plant, so that any defective items can be traced readily to the particular heat of steel from which it originated. The special heat treatment used, results of tests, etc., all are entered upon a card accompanying each tool throughout its manufacture. A research and service division also is maintained at the plant and here new tools are developed for the successful cutting of new metals and alloys.

Recently the company has developed two new drills that are creat-

Showing sequence of operations in forming twist drill by new method of hot twisting from rolled profile or grooved stock

ing considerable interest throughout the trade. These are the Blue Diamond high-speed drill, made in jobbers sizes up to ¼-inch, and wire gage sizes up to No. 60, and the Hercules Major drill, designed especially for drilling high manganese steel.

The former was designed for high production work and to overcome the excessive breakage factor. The latter type of drill is of a special design and is made from a special steel. It has a short point, and is shorter and heavier than is usually the case, to hold up under heavy service. These drills have been tested by various manufacturers of high manganese steel (10 to 15 per cent manganese) with exceptional results. They also give satisfactory results on the following metals which are often beyond the capacity of ordinary high-speed drills; heat and acid-resisting castings and forgings; stainless metals; cobalt magnet steels; unannealed and heat treated rail and tool steels; chilled cast irons; and hardened safe steels which are of the laminated type.

Roller Bearings Coming Into Standard Use on Nation's Rolling Stock

USE of steel roller bearings is steadily overshadowing bronze and babbitt metal bearings for rolling stock of railroads in this country. Steel bearings are being adopted for new passenger cars, freight cars, locomotives, and tenders as well as for replacements or repairs of equipment already in use.

A leading seller of the steel roller bearings for railroads reports that during 1931 a total of 188 new locomotives were purchased. Of these, 152 were completely equipped with roller bearings as against the older type of bronze, and babbitt friction bearing, and 15 additional locomotives have been specified as partially roller bearing equipped. The total of 167 locomotives using partial or full roller bearing equipment amounts to 89 per cent of new locomotives purchased during the year. In addition to these locomotives, 20 extra tenders completely equipped with roller bearings have been purchased.

Sees More Changes Ahead

The change-over of existing locomotives to roller bearings has not been extensive so far, it is stated, but in view of the advantages claimed for the roller bearing, one leading seller predicts that the return of normal times will see a considerable portion of existing locomotives completely or partially equipped with roller bearings.

Railroad car buying since the more active business years of 1927 and 1928 has been retarded to a large degree. During the current year, according to reports in the trade, only four new passenger cars were taken by the carriers. Therefore, 1931 figures on the use of roller bearings would be misleading. Several years ago, however, Walter C. Sanders, general manager of the railway division of Timken Roller Bearing Co., Canton, O., presented a paper before the Cleveland Railway club at Cleveland, in which he said: "Some idea of the extent to which roller bearings are now being utilized in railway service may be gained when we observe that within the last two years several prominent railway systems in the United States have placed in service approximately 850 passenger cars equipped with roller bearings. Many other roads have introduced roller bearing cars in smaller numbers. Most of these cars are for through main line service on steam roads. The others are in suburban service. On two large roads, all of the new passenger carrying equipment put in service within the past two years is on roller bearings."

In normal times, it is stated, 80 to 85 per cent of new passenger cars will be roller bearing equipped. The change-over of existing passenger equipment to the steel roller bearing has not been widespread due, it is said, to truck changes which usually are required, and to the reluctance of railroads to increase investments in old equipment.

Application of roller bearings to freight cars is still in the development stage, due to the problem of car interchange and to the problem of an interchangeable application for all types of roller bearings.

Standards Bureau Reports Activities for Year

In the annual report of director of the bureau of standards, Washington, for the period ended June 30, Dr. George K. Burgess reveals that in spite of reduced industrial activities the number of research associates stationed at the bureau by trade and technical associations showed little change. As of June 30, there were 95 associates from 45 associations, as compared with 96 from 41 associations the year before.

Principal researches conducted by the metallurgical division in the year included: Aeration and submerged corrosion, fluidity of liquid metals, shrinkage of molten metals, fatigue of metals—effect of inclusions, bridge wire, rail steel, spark testing of steel and machinability of metals.

Copies of the complete report may be obtained from the superintendent of documents, Washington, for 15 cents each.

Arthur Foundry, Summit avenue and Seaboard Airline railroad, Charlotte, N. C., has changed its name to Atlas Foundry.

AMERICAN ZINC INSTITUTE
ZINC INSTITUTE
2 OUNCE COATING
SEAL OF QUALITY
WHAT IS GALVANIZING
SEAL OF QUALITY HAS SUPERIOR
HOW IS ZINC COATING MEASURED?
HOW HEAVY SHOULD THE ZINC COATING BE?
HOW CAN SUCH HEAVY COATED SHEETS BE OBTAINED?

GALVANIZED ROOFING EXHIBIT ATTRACTS ATTENTION: Sponsored by the American Zinc institute, New York, this exhibit of heavy-coated galvanized sheets for roofing purposes has been attracting wide interest at fairs, expositions and conventions. The complete story of the "Seal of Quality" product, a roofing sheet with a 2-ounce zinc coating, is presented in visual form, a feature being the miniature farmstead displaying applicatons of metal roofing to different types of buildings. Ten manufacturers of galvanized sheets are using the quality mark under the zinc institute license, involving rigid inspection and testing of the product to insure maintenance of the coating standard

Feeder and Catcher Device Facilitates Sheet Rolling

AN ESSENTIAL part of the Aetna-Standard combination method for sheet rolling, is a new automatic feeder and catcher, designed by the Aetna-Standard Engineering Co., Youngstown, O., for use in conjunction with a standard hot sheet mill, and incorporating several improvements that will permit old style hand mills to deliver increased production at a lower cost and with less manual labor. Simplicity of design is claimed to minimize mechanical upkeep and reduce maintenance.

Feeder and catcher tables are so designed as to allow the mill to be accessible at all times, for changing rolls, applying roll heaters, etc. This can be accomplished by tilting the tables back to clear the mill housings, as shown in the accompanying diagram.

Tables Raise and Lower

In the operation of the equipment packs or sheets are brought to the feeder table either manually or mechanically. The sheet or pack then is fed mechanically through the mill where it comes to rest on the catcher table, which immediately raises and passes the sheet back over the top roll. The feeder table, having in the meantime elevated to the proper position, receives the sheet or pack and returns to the pass line where the operation is repeated.

These movements are performed at a speed practically equal to the capacity of the mill. The feeder table is operated so as to return to the pass line in a time period equal to the falling speed of the sheet. The tilting motion of the tables involves acceleration and deceleration to assure smooth operation and no undue strains on the equipment.

For actuating the sheets or packs to and over the roll, Melin insulated chains are used, which serve to eliminate hazards of scratching the surface of the sheet, prevent any appreciable amount of heat loss and provide greater friction for quick reversal during the rolling operation.

Controlled Automatically

By controlling the travel of the sheets or packs from the delivery side of the pass, over the top roll and back to the rolling position, the runback of sheets or packs on the feeder table is held to a minimum. This is effected by keeping the end of the pack or sheet close to the contour of the top roll.

Both feeder and catcher are controlled from one point by a single lever similar to an air pilot's control stick. When this lever is placed in the "automatic" position the tables will function continuously with no further attention. Side guards, or guides, are operated automatically for side matching and the end matching is regulated manually by the control stick. The equipment is adaptable for either loose or tight rolling.

Another essential feature of the combination method of sheet rolling is a new and improved device for polishing both top and bottom rolls while in operation. This equipment is designed to be attached to the mill housing and can be mounted or dismounted at will with the rolls in motion. Polishing is done by two special stones, which move back and forth over the entire face of the rolls. They are adjustable and can be controlled to meet the various phases of any polishing operation. They can be stopped at any point for localized polishing or their motion reversed at the wish of the operator.

No extra motive power is required as the polisher derives its movement from a simple crankpin, clamped to the wabbler end of the top roll. While the polishing action is adjustable to any length of the roll, the overall length of the equipment does not exceed the length of the roll itself.

Mechanical features of this equipment as well as the method of operation, in combination with other necessary equipment, are covered by patents and patents pending, either licensed or owned by the Aetna-Standard Engineering Co.

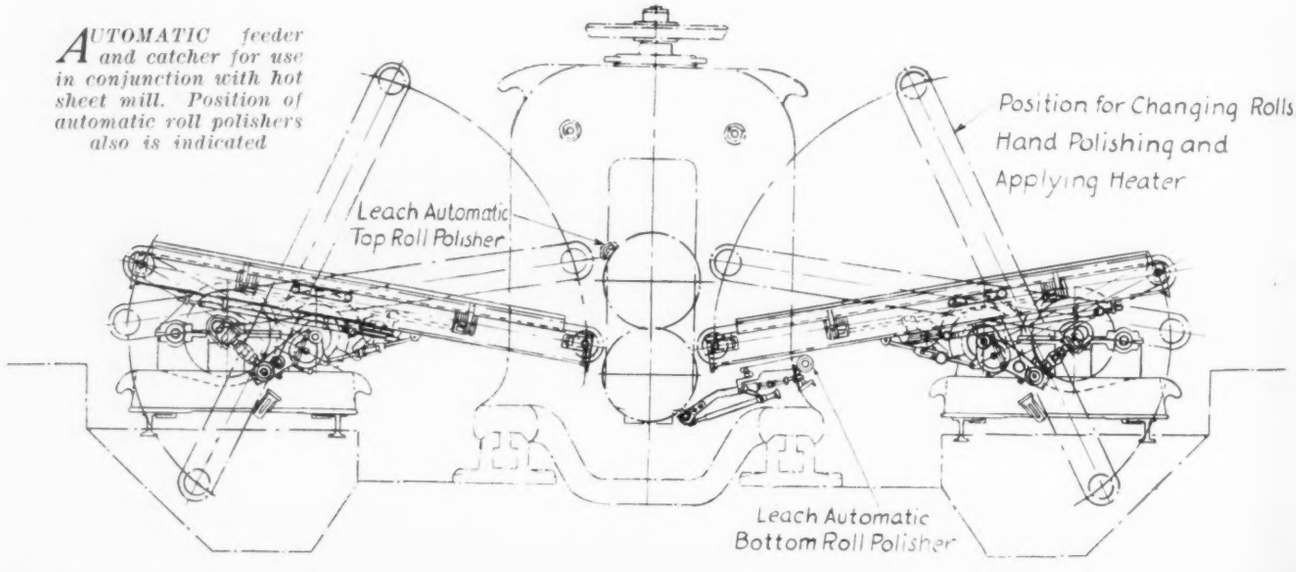
Gas Cutting by Machine Described in Booklet

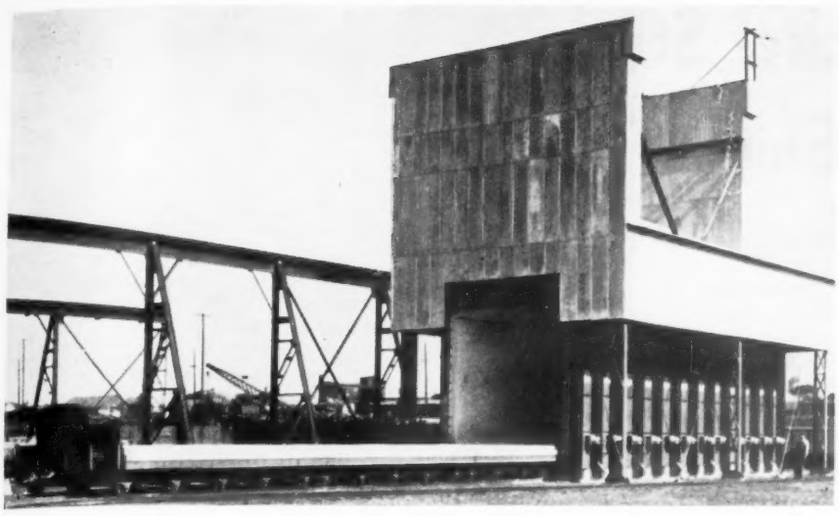
To point out the wide application of machine cutting of steel shapes by gas torch, the mechanics and economics of the process, and the operation of automatic cutting machines, the General Welding & Equipment Co., Boston, has published a 42-page booklet discussing these subjects.

The booklet is divided into three main sections, the first of which deals with the main fields of machine cutting and its importance to industry. Part II is on machine cutting with subdivisions on heat effects, limitations of the process, gases for cutting and cost of cutting. Part III describes automatic cutting machines built by the company.

A wide variety of illustrations and sketches adds much to the text. Shops interested in machine cutting will find the booklet valuable as a guide.

AUTOMATIC feeder and catcher for use in conjunction with hot sheet mill. Position of automatic roll polishers also is indicated


Position for Changing Rolls. Hand Polishing and Applying Heater
Leach Automatic Top Roll Polisher
Leach Automatic Bottom Roll Polisher



This huge car-type annealing furnace is used mainly for stress relieving large welded pressure vessels

Outdoor Annealing Furnace 60 Feet Long, 14 Feet Wide

ONE of the largest annealing furnaces in the country has been built by Babcock & Wilcox Co. at its Barberton, O. works, the unit to be used for strain relieving large fusion welded pressure vessels such as boiler drums, oil stills, reaction chambers and autoclaves, and for heat treating alloy steel structures. Its 14-foot 6-inch width inside the lining accommodates the largest diameter that can be shipped, while its 60-foot length inside the lining accommodates the usual range of vessel lengths, and the longest vessels that can be shipped can be handled by annealing one end at a time.

90-Foot Tower Handled

One of the welded jobs recently strain relieved in this furnace was a one-piece bubble tower 90 feet in length, 12 feet in diameter and weighing over 162 tons. A complete range of smaller diameters has been handled with plate thicknesses varying from 7/16-inch to 3 inches.

In general construction the furnace is of the car type with an electrically operated door. It is both over-fired and under-fired. Fuel is natural gas, with automatic control.

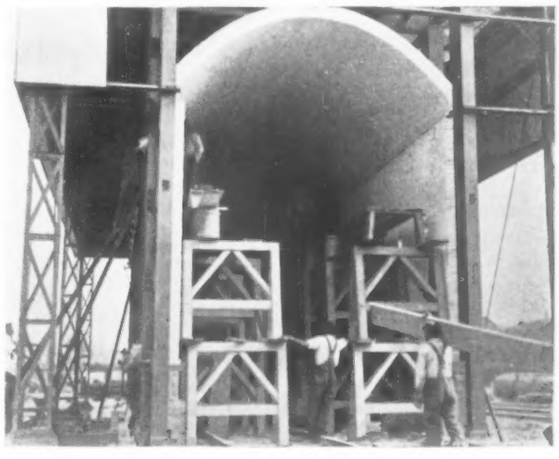
A thin wall and arch, only 9 inches thick, were made possible by the use of the recently developed B. & W. No. 80 insulating firebrick. That is, the wall is built entirely of the new insulating firebrick with no additional course of firebrick inside, as shown in an accompanying illustration. This thin wall, with its low heat capacity and high resistance to heat flow, gives a low fuel cost. By insulating firebrick is meant that the brick has insulating properties similar to those of the best insulating brick, and is, in addition, suitable for direct exposure to the flame, the only protection being a sprayed layer of refractory mortar.

Low Heat Conductivity

The insulating brick is made of kaolin, has a fusion point of 3190 degrees Fahr., with a thermal conductivity of 1.75 B.t.u. per square foot per inch of thickness per degree Fahr., per hour, at a mean temperature of 1000 degrees Fahr. Tests have shown that this brick can be used regularly at temperatures up to 2750 degrees Fahr.

The steel work of the car is protected by layers of the insulating brick, and piers of the same material, somewhat denser, are used for supporting the load.

The furnace is located out of doors with sufficient space allowed for quickly withdrawing the largest alloy structures for air quenching treatment. A corrugated iron roof protects the arch from the weather, and a casing similar to that used with Babcock & Wilcox economizers covers the walls.



CONSTRUCTION view illustrating the single 9-inch thickness of insulating firebrick used in walls and arch. Low heat capacity of the refractory results in low fuel costs

Enameled Steel Exterior Walls for Residence

Plans are being completed for what is said to be the first steel-frame house with an exterior of porcelain enameled steel, to be constructed in a suburb of Cleveland. Speed of erection and permanence of the enamel finish are advantages, according to the Ferro Enamel Corp., Cleveland, which devised this unusual type of exterior.

Specifications call for a steel frame of structural members made up of welded steel shapes insulated with 4 inches of rock wool. The enameled steel exterior units are made in the form of shallow rectangular pans of various sizes, carrying between their edges on the inside a layer of cane fiber board backing. Battens covering the joints on the outside also are of porcelain-steel. Any color in the ceramic range is possible, although this first house will have matte-glaze porcelain, about the color of rich buff limestone.

Floors will be of steel joists, on top of which will be laid a steel deck. Sleepers will be mounted on the deck with a grout of concrete between them, and the oak floor on top. Kitchen, lavatories, bath and basement recreation room will be lined with porcelain enameled steel throughout. Roof will be of porcelain-steel shingles, obtainable in various shades and textures. Brick chimneys also will be enclosed in porcelain-steel, while window sash and door frames will be of a corrosion-resisting steel.

High-Elastic Nickel Steel Developed for Ships

HIGH-ELASTIC nickel steel developed in the United States recently for shipbuilding purposes may be utilized in two super-liners which have been designed for the United States Lines and which are expected to be built ultimately for North Atlantic service. Minimum weight is paramount in these vessels because of the high speed contemplated. Use of the new steel, it is calculated, would effect a saving of from 1000 to 1300 tons, or approximately 4 per cent of the steel structure of each vessel.

In describing the proposed vessels at the annual meeting of the Society of Naval Architects and Marine Engineers in New York, Nov. 19-20, Theodore E. Ferris, naval architect and marine engineer, New York, revealed that two designs had been developed, one having geared turbine drive and the other turboelectric drive.

The geared turbine ship would be 963 feet 3 inches long, and would have a gross tonnage of 56,000, a mean voyage speed of 29½ knots and a steel structure of 26,260 tons. The electric ship would be 984 feet 6 inches long, and would have a gross tonnage of 60,000, a mean voyage speed of 31 knots and a steel structure of 27,350 tons.

It has been considered essential that all parts of the hull, machinery, equipment and outfit be as light as possible consistent with necessary strength and rigidity. To this end welding has been specified wherever practicable. Considerable aluminum and aluminum alloy will be used and to reduce weight in the hull structure, a large amount of high-tensile steel will be employed.

Used in British Ships

In building large vessels recently in Great Britain and other European countries high-elastic steel has been used to a considerable extent for the strength members with marked saving in weight. In the United States no such steel has been used for merchant shipbuilding as the size of ships has not required it. In designing the new super-liners, however, about one year has been spent in work with steel companies of this country in an endeavor to obtain the production of a high-elastic steel which would be satisfactory for shipbuilding purposes.

This steel must be of good workability and of such increase in strength over mild steel as to effect a material saving in hull steel weights. In vessels of the super-liner size, requiring some 27,000 tons of steel, possibly 8000 to 12,000 tons or more of high-elastic steel might be employed at a net weight saving of 1000 to 1300 tons.

There has been developed in England a high-elastic limit steel specially adapted for shipbuilding purposes, the trade name of which is Martinel. This steel acquires its superior qualities by a process of heat treating. Lloyd's Register of Shipping recognizes the superiority of this steel and its rules cover it in the following way:

Tensile strength is not to exceed 85,000 pounds per square inch with a range of not more than 11,200 pounds per square inch in any one case; the elongation must be not less than 20 per cent in length of 8 inches; the limit of proportionality must be not less than 33,600 pounds as determined by a Ewing extensometer, or other approved extensometer of 8-inch gage length.

Allow 10 Per Cent Reduction

The latter tests consist of the application of a load of 4480 pounds per square inch and then increasing this load to 33,600 pounds. On reducing the load to 4480 pounds, the permanent set in 8 inches, as measured by the extensometer, must not be more than 0.0004 inch. For the substitution of this material for mild steel Lloyd's have in general allowed a reduction of 10 per cent in thickness for plates and shapes, including transverse framing as well as longitudinal strength members.

After consulting other steelmakers, according to Mr. Ferris, the Lukens Steel Co., Coatesville, Pa., agreed to develop for shipbuilding purposes a nickel steel which it had already supplied extensively for locomotive boiler work. This steel, containing approximately 2½ per cent nickel, has the distinct advantage of attaining the high-elastic qualities without heat treatment, which makes it possible to heat this material for forming purposes without danger of losing its elastic qualities. Furthermore, it can be welded satisfactorily with proper welding technique.

Tests of this material, plates of which were rolled for and sent to the Newport News Shipbuilding & Dry Dock Co., Sun Shipbuilding & Dry Dock Co. and United States navy department, were witnessed by representatives of the American Bureau of Shipping and Lloyd's Register of Shipping and showed the following average properties:

Tensile strength, pounds per square inch	90,600
Yield point, pounds per square inch	52,000
Elongation in 8 inches, per cent	20.3
Reduction of area, per cent	43.2

These are mill tests under the usual classification society methods. The material was bent cold 180 degrees around diameters equal to the thickness of the specimen without failure, except in one instance when a re-test from the same plate was satisfactory. Drift tests consisted of enlarging holes which had been punched 1½ diameters from the planed edge to 1½ times the original diameter; no fracture of the plate resulted. The average brinell hardness is 179. Six specimens having welds across the test length broke in the weld at an average stress per square inch of 88,600 pounds. The average elongation of these six pieces was 8.7 per cent.

The average proportional limit of 14 pieces, as determined by a Ewing extensometer was 41,860 pounds per square inch, the minimum being 38,900 pounds and the maximum 46,800 pounds. Following the methods prescribed by Lloyd's, the elongation resulting from the change of load from 2 to 18 tons per square inch and reduced to 2 tons resulted in a permanent set of 0.0004 inch, the minimum being 0.00015 inch and the maximum 0.00065 inch. It would appear reasonable that Lloyd's limit of 0.0004 inch for a load of 15 tons should be

Properties of Special Quality Shipbuilding Steels

Type of steel	Limits of tensile strength, tons per square inch	Minimum proportional limit, tons per square inch	Minimum elongation in 8 inches, per cent
High elastic limit mild steel	30-35	15	20
	(or any 5-ton range under 38 tons per square inch)	15	20
Admiralty "D" steel	37-43	17	17
Structural silicon steel	36-42.5	15	16
Structural nickel steel	38-44.5	....	15
High-tensile nickel steel	38-42	18.75	20
Ordinary mild steel	26-32	....	20

The Morse Line includes High Speed and Carbon

DRILLS
REAMERS
CUTTERS
TAPS AND DIES
SCREW PLATES
ARBORS
CHUCKS
COUNTERBORES
MANDRELS
TAPER PINS
SOCKETS
SLEEVES

Cut the cost of manufacture with these high production tools

SMALL tool waste, which may have gone unnoticed a few years ago, stands out like a sore thumb in these days of production economies.

MORSE Tools will keep your production costs down to bed rock. Their savings are the result of uniformly long life between sharpenings, uniformly high cutting ability.

MORSE

TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASS., U.S.A.

increased to 0.0005 inch for a load of 18 tons.

Use of high-elastic nickel steels of this or a superior quality is proposed for the flat plate keel and doubling; bottom, bilge and side shell plating; centerline keelson, including top and bottom angles; continuous longitudinals in the double bottom, including top and bottom angles; inner bottom plating; shelter "B" deck plating, including the overhang structure at the sides.

It is intended to use this high-grade steel throughout the aforementioned of the ship's structure, except at the extreme ends of the decks and shell plating where thickness to give rigidity and stiffness is of more importance than extra strength. However, it is not the intention to have this steel adjacent to mild steel, where any defects might result from slight differences in the moduli of elasticity of the two materials.

Weight Saving Is 1300 Tons

The net weight of the parts mentioned is about 10,200 tons when using mild steel where shown and the ordinary navy high-tensile steel in the topside members. By the substitution, except as noted, of 7800 tons of nickel steel, a saving in net weight of steel of 1300 tons probably will be made possible. A further saving in weight doubtless would be effected by the substitution of this material in parts of the ship framing.

The proposed thickness of the material in the topsides of the ship would be such as to give a maximum stress of about 28,000 pounds per square inch with a bending moment of 2,100,000 foot-tons. Of course, a further saving could be effected when taking account of the fact that the reduction of 1300 tons in steel weight will probably reduce the bending moment.

It appears possible that by the further substitution of about 950 tons of this material for 500 tons of mild steel in the main promenade house side, the open promenade house side, the open promenade deck and the sun deck, all expansion joints, except above the sun deck and perhaps one joint at the after end, could be eliminated.

Further Reductions Possible

Partly counteracting this addition of 450 tons in the house structure, there should be a further reduction in the thickness in the main promenade deck, "A" and "B" deck plating, and the shell in way of the upper superstructure of about 150 tons, which will give a net reduction in steel weight of about 1000 tons, if the expansion joints are omitted.

The thickness of material in the deck-house structure, under these conditions, would be arranged to give approximately the same maximum stress per square inch as that obtained in the main hull structure without the elimination of expansion joints; namely, 28,000 pounds per square inch. The total weight of this new steel required, when omitting expansion joints, would be about 8600 tons.

A further advantage in the substitution of this material is that thinner plates are possible, enabling better riveting and also the possibility of punching the nickel steel plates in place of drilling the navy high-tensile steel plates, which form the topside members of the hull.

According to Mr. Ferris, it is believed that for monster liner construction the use of high-elastic steel for all strength members, both longitudinal and transverse, is a necessity, provided that this material can be commercialized as a good shipbuilding steel, which is workable, weldable, etc., and provided that it can be produced at a cost that is not too excessive over the ordinary mild steel. The cost of this higher grade material would be much reduced if it could be ordered so that all or nearly all of it, amounting to 8000 to 9000 tons, could be rolled at one time.

Commenting further on the new high-elastic nickel steel, William Bennett, senior surveyor, Lloyd's Register of Shipping, New York, stated that the manufacturer depends entirely upon composition and the special method of rolling to develop the necessary physical characteristcs and not upon heat treatment and normalizing.

The company's requirements call for the following minimum physical tests:

Ultimate tensile strength pounds per square inch	85,000
Yield point, pounds per square inch	50,000
Proportional limit, pounds per square inch	40,000
Elongation in 8 inches, per cent	1,600,000 / tensile strength
Reduction of area, per cent	40.0

For plates over 1-inch thick, a deduction from the percentage elongation given above of 0.25 per cent is made for each increase of 1/32-inch, to a minimum of 15 per cent.

Bend test specimens to withstand being bent cold through 180 degrees without cracking on the outside of the bent portion, as follows: For material ¾-inch or under, around a pin the diameter of which is equal to the thickness of the specimen; for material over ¾-inch, around a pin the diameter of which is equal to twice the thickness of the specimen.

Punched rivet holes spaced two diameters from a planed edge to withstand drifting until the diameter is enlarged 50 per cent, without cracking the metal.

Chemical composition of the steel is given as follows:

	Per cent
Manganese	0.60-0.90
Phosphorus	not over 0.04
Sulphur	not over 0.045
Nickel	not under 2.75

As the maker desired an accurate determination of the physical properties of the new product, the process was followed through in the mills and samples ranging from 0.50 to 0.68-inch thick were selected, taken both

NEW BLOWPIPE FOR PIPE LINE WELDING: Developed by the Linde Air Products Co. to promote greater speeds and economy in pipe line welding, this blowpipe is of the two-flame type, one a welding flame and the other a smaller flame for preheating the rod which is fed automatically by gravity. The welding rod also can be moved up or down by means of a trigger on the handle of the blowpipe. A carriage having two runners supports the apparatus during the welding operation which is carried on by the back-hand method so that the completed weld is on the opposite side of the rod from the flame. The operator needs only one hand to guide the blow pipe, assuring him maximum comfort and minimum fatigue

A New Service for Steel Users

ILLINOIS SCULLY STEEL WAREHOUSE COMPANY

Subsidiary of United States Steel Corporation

A Consolidation of

Illinois Steel Warehouse Company
and
Scully Steel and Iron Company

Former management of the two companies will be retained in the new organization. All Chicago warehouse stock will be consolidated at 1319 Wabansia Avenue where additional warehouse space will accommodate a greater variety of light and heavy rolled steel products, specialties and machinery.

General Offices and Warehouse
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longitudinally and transversely. Fifteen samples of standard dimensions were taken in the as-rolled condition and 29 samples were tested after machining to a round section with screwed ends. The comparative average figures for the respective tests were as follows:

	As-rolled specimens	Round specimens
Ultimate tensile strength, pounds per square inch	90,500	88,400
Yield point, pounds per square inch	51,600*	46,340**
Elongation in 8 inches, per cent	20	19
Reduction of area, per cent	43	56

*Drop of beam method. **Johnson's method.

The difference in the average ultimate tensiles is noticeable and is explained by the dissimilarity of the specimens. In the round specimens, the outer surfaces or skins were removed entirely, resulting in decreased tensile properties as compared with the as-rolled specimens.

It should be noted in connection with the figures given for the yield points that the usual drop of beam method was adopted in the first set of tests, whereas Johnson's method was used in the second set as being more correct.

Proportional limit tests were also made on 14 samples by using a Ewing extensometer and gave an average proportional limit taken autographically of 42,000 pounds per square inch over all samples tested.

A comparison of these results with results on other steels, as shown in the accompanying tables, shows the material to be of high quality both as to ultimate tensile and limit of proportionality. Bend, shearing and punching tests were satisfactory and these, with the foregoing results, show the material possesses good ductility. The surface of the material appeared unusually smooth and uniform.

The analysis of the material was stated to be as follows:

	Per cent
Carbon	0.21
Manganese	0.82
Phosphorus	0.04
Sulphur	0.022
Silicon	0.24
Nickel	2.71

Vertical Cable Testing Machine Has Capacity of 1,000,000 Pounds

WHAT IS claimed to be the largest vertical compound lever testing machine ever made in Great Britain for tensile testing wire cables, recently has been shipped by W. & T. Avery Ltd., Soho foundry, Birmingham, England, to the department of mines of the Canadian government for installation at the Government House at Toronto, Ont.

The machine is shown in the accompanying illustration as it appeared before shipment. It has capacity for tensile testing wire rope specimens up to 11 inches in circumference and 6 feet in length, to a limit of 1,000,000 pounds. The lower half of the unit as it appears in the illustration will be below floor level after installation, the height above floor level being only 12 feet. The vertical arrangement has been considered to be more suitable due to the somewhat confined space available for installation.

The chief constructional features comprise a massive three-section base, enclosing the main lever system and straining gear, and surmounted by a heavily ribbed cast steel platform supported on knife edge bearings on the weighing levers. Bolted to each of the four corners of the weighing platform are heavy cast iron columns supporting at their upper end the weighing crosshead, into which the upper end of the specimen is held in a special type of split grip.

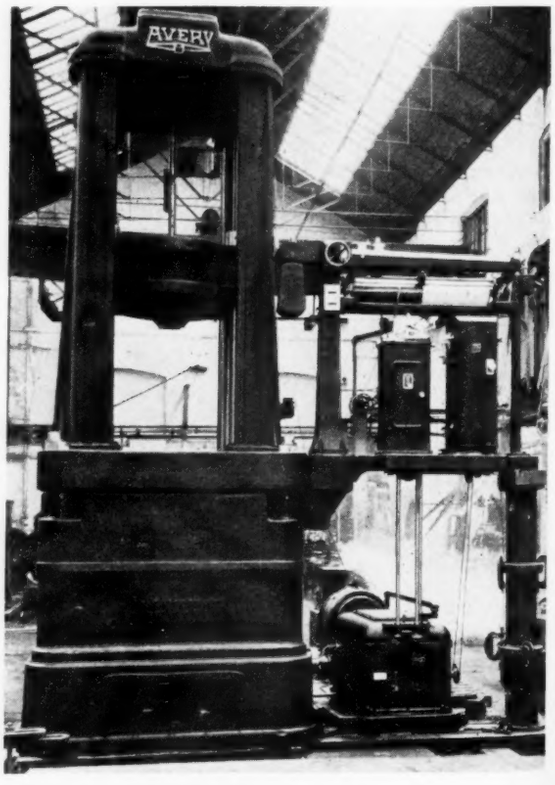
Projecting through the weighing platform are four 5-inch steel straining screws for holding the cast steel crosshead in which the lower end of the specimen is held. Power is furnished by a protected reversible 550-volt 3-phase motor fitted with continuously rated slip rings and controlled by a drum-type combined stator and rotor starter. Straining speeds of 0.1-inch and 0.4-inch per minute are obtainable, with setting speed, both forward and return, of 8 feet per minute. Total movement of the lower crosshead is 8 feet.

By means of levers and transfer levers the tension on the crosshead is reduced in the ratio of 20,000 to 1 to permit readings at 50-pound intervals on a micrometer dial fitted to the poise propelling screw. Vernier readings are possible on light tests.

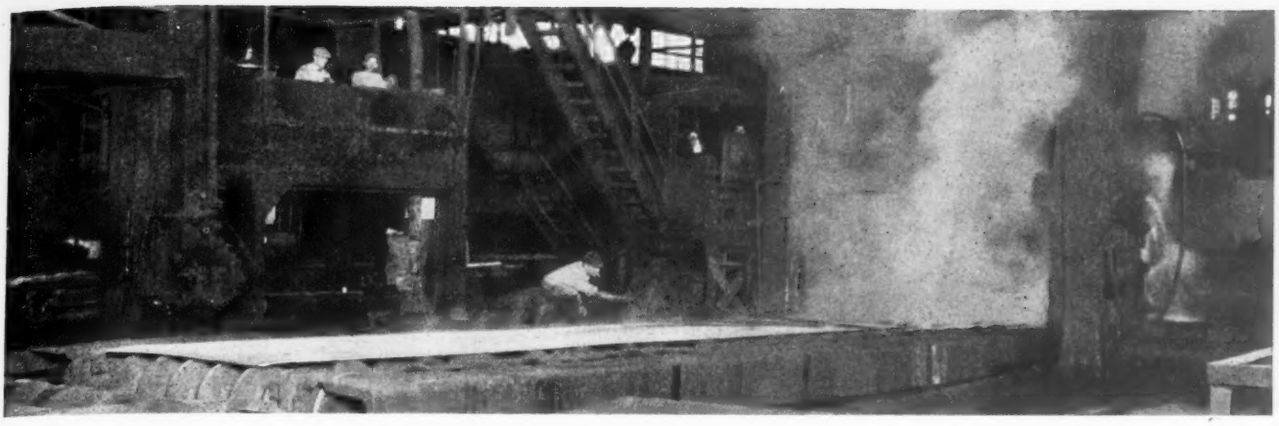
Signal System Provided

A system employing automatic bell and buzzer signals has been provided to warn the operator regarding the speed of the poise movement, facilitating accurate measurement of the load being applied. An additional feature is an autographic recorder, visible behind the beam at the right of the illustration, and arranged to permit duplicate records of a test to be taken. The recording chart is on a rotating drum, with a pen carriage adjusted to indicate the load being applied to a specimen.

To permit the elongation of a specimen to be recorded the drum is rotated by means of a steel tape carried from the specimen to a pulley on the drum. Actual elongation, 5 to 1 or 10 to 1 magnifications of it, may be indicated.



VERTICAL machine for testing tensile strength of heavy wire cables, as it appeared before shipment. When installed the bases of the control cabinets will be flush with floor level. Capacity is 1,000,000 pounds



PROGRESS IN STEELMAKING

SYNCHRONIZING the system of handling steel sheets from car to storage by the use of two types of mobile equipment at a plant in the Detroit district, has resulted in reducing the actual handling costs 85 per cent, a marked decrease in the cost of operation and the quantity of damaged sheets, the elimination of accidents and a saving of 50 per cent in the storage space. The bundles, placed crosswise in the car on heavy timbers, are lifted by a large fork truck and moved opposite the car door. Meanwhile, the load is elevated for a trailer to be spotted beneath and then lowered on the bed. After the loaded trailer is pulled from the car the lift truck moves forward, picks up another bundle and repeats the operation. When one-half of the car is unloaded the truck, facing the other way, unloads the other half. So well has this operation been synchronized that an 80,000 pound car can be unloaded in 15 to 20 minutes.

♦ ♦ ♦

Instead of using a taper of 2 inches on big-end-down molds for 3 to 4-ton ingots, the tendency is to hold the taper to as little as ½-inch.

♦ ♦ ♦

Interposing an automatically-controlled electric furnace between the roughing and finishing trains of a cold strip mill, has afforded an Ohio producer a more uniform anneal and a saving of 50 per cent in the annealing time.

IN MAKING soft steel to a low manganese specification it usually is the practice to remove some of this element in working the heat. One open-hearth operator has observed that the carbon is in ratio with the manganese content in these heats and if the carbon takes a drop there will be a corresponding decrease in the manganese. Many melters, he states, miss the manganese requirements because the last preliminary analysis shows high manganese and low carbon which should call for a manganese addition in the ladle.

A RECENT development in the design of scrap baling presses affords the operation of the vertical high-pressure cylinder above the press instead of beneath. By this arrangement the working parts of the cylinder are available for ready inspection, no deep pit is required and the danger of pieces of scrap catching between the packing glands and ram is obviated.

♦ ♦ ♦

Coke oven gas enriched by a small amount of blast furnace gas with a nominal air preheat assures the successful operation of a reheating furnace and will improve soaking pit operation, according to tests recently made by a consulting engineer.

♦ ♦ ♦

At a plant in Cincinnati where two galvanizing pots recently were equipped with pyrometer controllers which register the temperatures of the zinc bath through thermocouples and control the motor-operated gas burner valves, a saving of 10 per cent in dross and a marked extension in the life of the pots have been effected. Overnight the control is set at a temperature just high enough to prevent freezing of the zinc and at the start of a turn the temperature is increased at short notice, thus avoiding the remelting of the entire bath and high fuel consumption.

♦ ♦ ♦

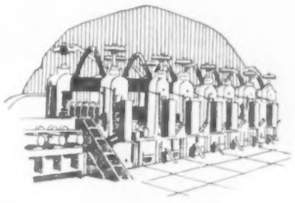
Rust-resisting tin plate is one of the most recently developed products added to the long list of steel commodities. The base metal for the black plate is a copper molybdenum iron made by an Ohio producer.

♦ ♦ ♦

One of the most recent applications of synchronous motors is for driving flying shears. At a strip mill where the stock from either one of three finishing stands is delivered to a shear of this type, a synchronous generator, which supplies power to the 125-horsepower synchronous motor driving the shear, is connected to the 2000-horsepower motor driving the stands. By this "synchronous tie" between mill and shear, the strip is cut to commercial lengths with an accuracy of 1/16-inch on 8 to 10-foot lengths.

♦ ♦ ♦

A test recently made to determine the scale loss on heating ingots in a standard soaking pit and in a small experimental direct-fired pit discloses an average scale loss of 2 per cent on the standard pit compared with 0.77 per cent on the unit fired with automatic proportioning burners.



ON a recently completed continuous billet mill in the Pittsburgh district, a depressing table is employed on one side of the down-cut shear to prevent bending the bloom while the cut is being made.

ACME

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Nirosta Chrome Nickel Strip
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••••

Long Length Coils
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STEEL

44

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

Electric Heat

Electric heat for the metal industries, by J. C. Woodson, in Electrical World, Dec. 5, 1931, p. 1004, 4 pp., 10 illusts.

Within recent years certain industries, such as the electrical, wire manufacturing, strip and tube mills, have developed better and more reliable annealing practices, but the bulk of raw metal from large mills still is being either improperly annealed or is shipped to the user unannealed. Demands of large fabricating plants are bringing about a rather rapid change in these conditions in that the steel mills are being compelled to produce at their plants materials such as sheet, tubing, shapes, castings, etc., to meet definite and rigid specifications as to hardness, strength, grain size and structure, and surface finish.

This trend will mean in the future the installation of more of the large continuous electric furnaces for sheet annealing and normalizing, and with artificial atmospheres. There will be also a rather extensive development and application of the principle of inductive heating to the numerous heat treating processes now considered unsuitable.

STEEL, 12-28-31

Welding Alloy Steel

Procedure involved in the welding of corrosion-resisting alloy steels, by W. B. Miller, in Metal Progress, December, 1931, p. 68, 5 pp., 4 illusts.

As the applications of high-chromium irons and steels broaden in their scope, a knowledge of the proper procedure for welding the various alloys becomes necessary. These metals can be welded whether they are in thin-gage sheets, plates or castings. A neutral flame just large enough to insure proper fusion should be used, since too much heat causes the molten metal to boil, resulting in a porous weld. A blowpipe flame with excess acetylene increases the carbon content and will lower the resistance of the joint to corrosion. On the other hand, an excess of oxygen will cause the formation of a quantity of infusible oxide.

Welding should be carried through to completion as rapidly as possible. It should nearly always be done on one side only. The welding rod should not be "puddled," because weak, porous welds will result. Castings should be preheated and subsequent cooling should be slow. Satisfactory joints in commercial high-chromium alloys cannot be obtained without the use of a flux to dissolve iron oxide and chromium oxide. Cromaloy flux, a special preparation, is well suited to this purpose. Welding procedure is outlined for six groups of alloys, varying in alloy content.

STEEL, 12-28-31

Soil Corrosion

Soil corrosion studies on specimens of nonferrous metals and alloys, metallic coatings and specially prepared ferrous pipe, by K. H. Logan, bureau of standards research paper No. 359, 21 pp., 1 illust., 17 tables.

This discussion presents the results of the examination of samples of nonferrous materials and metallic protective coatings removed from 45 soils after exposure from four to six years. Included in the test were specimens of copper and brass pipe, cast and forged brass fittings, galvanized pipe and sheet steel, lead sheet, lead-coated pipe and lead-coated and galvanized bolts. Data on the rates of corrosion of steel pipe also are presented as a basis for comparison. The nonferrous metals tested were found to resist corrosion somewhat better than steel but they were not unaffected by soil action. All of the metallic coatings tested appeared to increase the life of the material to which they were applied, but showed evidence of deterioration in several of the soils.

STEEL, 12-28-31

Tapered Roller Bearings

Application of tapered roller bearings in merchant-bar mills, by S. M. Weckstein, a paper presented at the annual meeting of the American Society of Mechanical Engineers in New York, Nov. 30-Dec. 3, 6½ pp., 15 illusts.

Tapered roller bearings have played an important part in the numerous developments in the art of rolling metals. Their use has made possible a considerable decrease in the consumption of power by the elimination of friction, a considerable decrease in the cost of lubrication and general maintenance, an increase in the speeds of operation and consequently the tonnage produced, and a marked increase in the accuracy of the product.

The actual experience, over a period of five years, in the proper design, mounting and operation of bearings in merchant-bar mills is discussed, with extracts being cited from the results of a series of power tests made on the same mills alternately equipped with plain and tapered roller bearings. Various means of lubrication of rolling mills, pinion stands and gear drives are described. The design of suitable bearing closures also is taken up and shown in detail. Illustrations show equipment in actual operation in various mills.

STEEL, 12-28-31

Steel Quality

How a large tractor company controls quality of purchased material, by G. C. Riegel, in Iron Age, Dec. 3, 1931, p. 1426, 3½ pp., 6 illusts.

Convinced that chemical analysis alone is not sufficient as a test by which the user can be assured of uniform quality of steel, the Caterpillar Tractor Co., Peoria, Ill., has adopted several other tests which such material must meet. It has confined its specifications to minimum qualities after abandoning the idea of average quality as nonrepresentative. After four years' experience in using such tests the company has found 90 per cent of the material offered acceptable.

Upon receipt of steel at the forge shops of the company, a minimum of 10 per cent of the "tops" and "bottoms" of the ingot product is macro-etched and drilled for chemical analysis at the center of the bar, billet or bloom. Failure to fall within a plus or minus tolerance of less than half the S. A. E. chemistry limits may mean outright rejection, or final disposition through further physical tests.

Heat treatment is carried out in furnaces of special design, developed by the company's engineers for obtaining the maximum physical characteristics of which the steel is capable.

STEEL, 12-28-31

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Continuous Filing Machine Has New Features

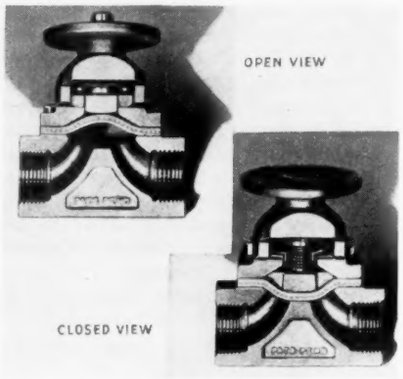
Grob Bros., Ninety-seventh street and West National avenue, West Allis, Wis., has placed on the market a new floor type continuous band filing machine which incorporates features increasing accuracy in filing and lapping of punches, dies and miscellaneous parts.

Positive drive of the file chain is obtained through a series of equally spaced drive pins mounted in the lower sheave and matching with the links of the chain. The drive pins are located in the center of the groove in which the chain operates and are cushioned by helical springs so that they can adjust themselves properly to the links of the chain insuring a positive drive, yet not stretching or in any way harming the chain.

Proper tension on the file chain is obtained through a hand wheel at the right side of the machine, which actuates the upper sheave through a hinged bracket. The hand wheel is cushioned by a helical spring and an adjustable pin mounted on the frame of the machine close to the spring acts as a stop against the hand wheel as soon as the spring is properly compressed. The arrangement prevents over-tightening of the chain and thus adds to its life.

The tiltable work table is 17 x 21 inches and is positively adjusted by a hand wheel directly in front and under the table as shown in the accompanying illustration. Overall height of the machine is 63 inches, the table being 39 inches above the floor and the space between the surface of the table and the frame is 7¼ inches.

Continuous band filing machine built by Grob Bros.



Valve for general service is marketed by Hills-McCanna Co.

Diaphragm Protects Working Parts of Valve

Hills-McCanna Co., 2349 Nelson street, Chicago, has acquired the manufacturing and sales rights on a valve that was perfected by P. K. Saunders, a mining engineer in South Africa. The valve originally was intended to eliminate leaks in water and air lines that caused a large unnecessary expense each year.

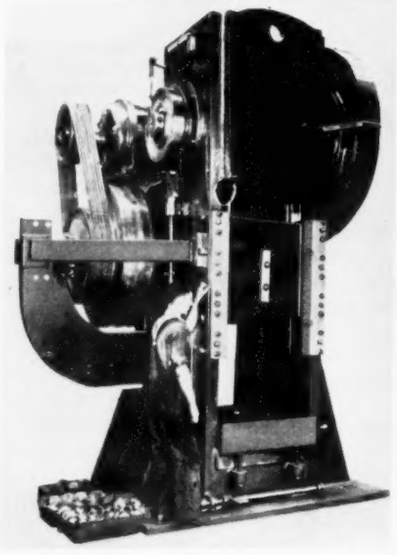
The new valve, shown in the accompanying illustration, has no metal to metal seats, no stem packing or stuffing boxes, and is recommended for general service. Materials handled never reach the valve bonnet. The diaphragm protects all the working parts from substances handled. This is an important feature when handling volatile liquids, gasses and air, liquids having gritty solids in suspension and corrosive liquids. Access to the bonnet or body does not require removal from the line.

In the closed position the diaphragm is compressed between the compressor follower and the seat. An even distribution of pressure on the diaphragm is secured through proper designing and machining of the seat and compressor.

Welded Steel Construction Used in Presses

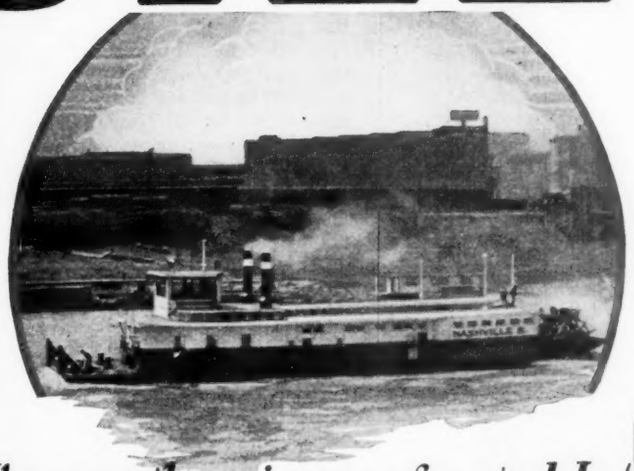
Allsteel Press Co., 12015 South Peoria street, Chicago, is building a new line of power presses up to 5000 tons capacity for hot pressing, bottoming, sizing, coining and pressure finishing in one operation. Typical of other units developed by the company, welded steel plate construction is employed. The accompanying illustration shows a forging press of 800 tons capacity, included in this new line.

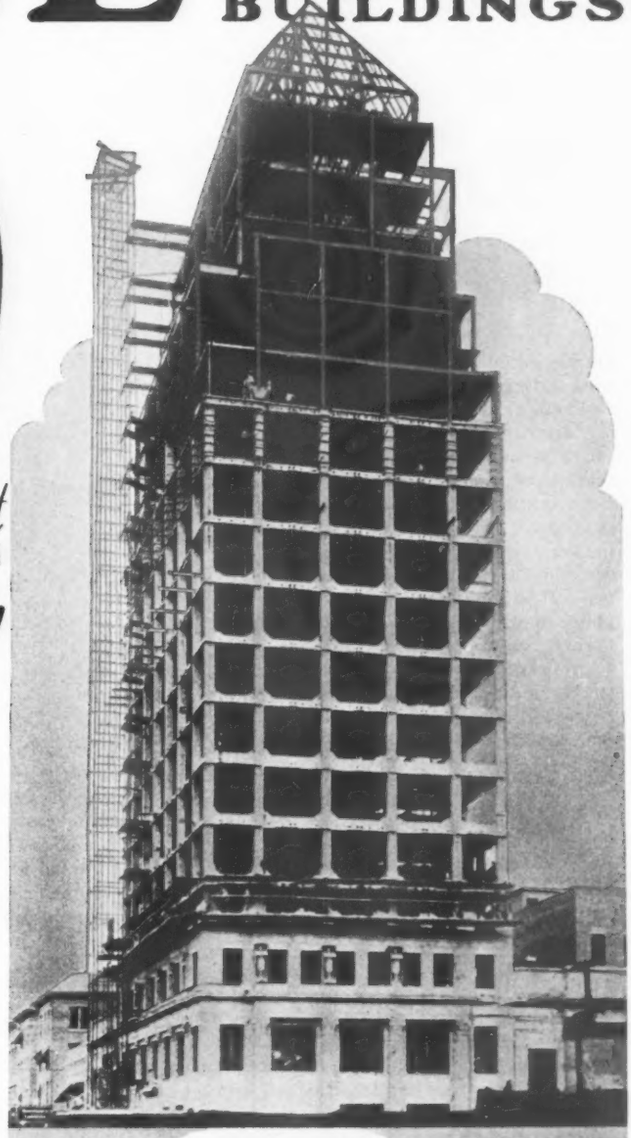
In the fabrication of these new presses, plates of required thickness are cut to size and shape and welded into units with ribs and supports to provide the desired rigidity. The ram likewise is a welded unit and is of the



800-ton forging press designed by Allsteel Press Co.

STEEL FOR BOATS BRIDGES OR BUILDINGS





Wherever there is a use for steel-Let
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figure on your requirements. Quality products backed by careful inspection—prompt shipments, with intelligent cooperation through understanding of the customer's needs—these are some of the reasons which make Tennessee a desirable source of supply.

Products: **Structural Shapes, Plates, Bars and Small Shapes, Sheets (Blue Annealed, Black and Galvanized), Rails and Accessories, Forgings Castings, Semi-Finished Products, Pig Iron.**

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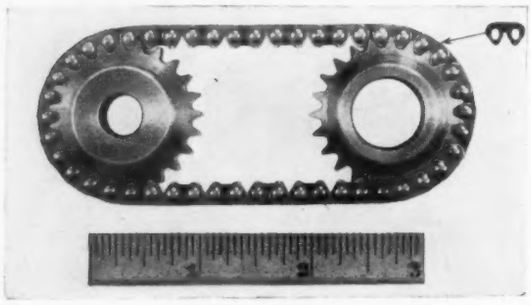


SILENT chain of $\frac{3}{16}$-inch pitch announced by Link-Belt Co. is made in three types, middle guide, side flanged and duplex. The first two are employed where all shafts are driven in one direction

double housing type. Wide, heavy steel gibs with phosphor bronze facings are utilized, and adjustment is made from the front.

Crankshafts are turned and ground from heat treated alloy steel forgings. Both crankpin and eccentric types are supplied. Main bearing are phosphor bronze bushed and backshafts are equipped with roller bearings. Gears are of arc welded construction, the rings being rolled from flat stock. Either roller bearing, multiple disk friction clutches or the conventional jaw type are available. In most cases, however, friction clutches are recommended for the heavier presses. Positive forced feed lubrication is employed.

◆

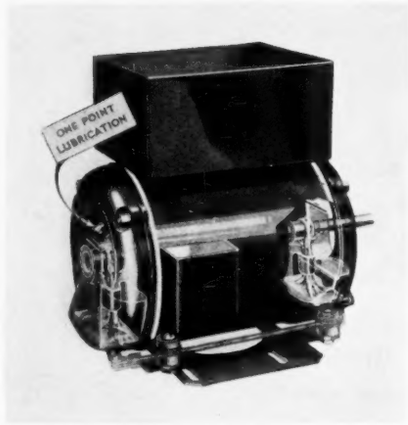
Designs Series of General Utility Presses

Hydraulic Press Mfg. Co., Mt. Gilead, O., has introduced a new series of general utility presses for automotive plants, railroad shops, foundries and general machine shops. As shown in the accompanying illustration the new oil pressure unit is the vertical downward-acting, two-rod plunger type. It is self-contained with an electric motor drive. The operating pressure is generated by a high-speed type radial pump.

Complete control over ram movement is assured through a single hand lever that, when placed in its proper positions, enables the operator to start, stop or reverse the press action anywhere within the limits of the ram travel. Two speeds forward are provided, a rapid speed in closing to the work and a slower speed in the actual pressing operation.

The hydraulic operating system used in connection with the two-rod types of forcing and straightening presses consists of an oil tank placed directly above the ram which contains the pressure fluid and lubricant for the entire machine. It is fitted with level gage, filling screen, cover and air filter.

These new two-rod plunger type of oil pressure presses are built in six



Howell fractional horsepower motors are automatically lubricated

pressure capacities ranging from 25 to 200 tons, inclusive, and in four bed sizes, two square and two extended.

◆

Automatic Lubrication Is Feature of Motor

Howell Electric Motors Co., Howell, Mich., is offering automatic lubrication of bearings as a feature of its new fractional horsepower motors. The motors, one of which is shown in the accompanying illustration, are of the condenser start, induction run type.

This new electric motor feature has two oil wells, one for each bearing, each having a reserve capacity of two cubic inches of oil. Ample lubrication thereby is provided to sustain the unit over a long period of time without adding new oil or giving it further oiling attention. The wells are filled at the factory with SAE 20 grade oil.

Each well is connected with the other at the bottom by a pipe line giving the advantage of one-point lubrication through this self-leveling feature. It's shape and design are such as to make it non-spillable no matter what position the motor is in.

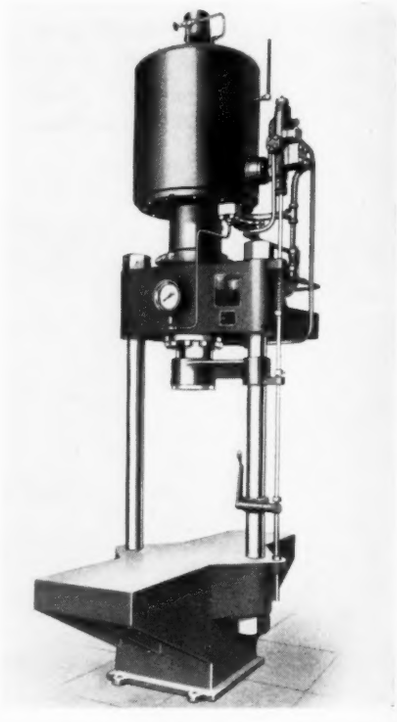
Sleeve bearings are wool yarn packed and have a wick running to the bottom of the well, which carries oil from the reserve supply to the bearing only as needed, permitting the shaft to roll on a thin film of oil at all times. This motor offers the advantages of quiet operation and no radio interference.

◆

Small Silent Chain Drives Made in Three Types

Link-Belt Co., 910 South Michigan avenue, Chicago, recently introduced a silent chain and sprockets of 3/16-inch pitch, said to be the world's smallest silent chain drive. The new chain, shown in the accompanying illustration, is made in three types—middle guide, side flanged and duplex. The middle guide and side flanged chains are employed where all shafts are driven in one direction, and the duplex chains where reverse direction is desired on some shaft or shafts, or where adjustment features are wanted.

The "X" type pin assures a chain joint, even in this size chain, that will give long and efficient service. This tiny drive was brought out to meet the growing demand of power transmission engineers, machine designers, and machinery users for a positive yet flexible drive for fractional horsepower motors and units.



Vertical downward-acting press built by Hydraulic Press Mfg. Co.

Structural Awards Buoy Year-End

Pipe, Railroad Requirements More Encouraging—Automotive Tonnage Still Deferred—Operations Expected To Snap Back—Prices Softening

AN ENCOURAGING number of specific steel construction projects are developing which in a degree neutralize the year-end slump in production and further weakness in prices. It is significant that structural awards in the past week, amounting to 45,520 tons, almost at the transition from the old to the new year, were the largest since the fourth week in September, due mainly to placing of 16,000 tons for the Pittsburgh postoffice with the Fort Pitt Bridge Works Co., Pittsburgh, and 3300 tons for the First National bank building, New York.

Structural awards for the year, now approximating 1,780,000 tons, are only about 90,000 tons less than those in 1930. Awards totaling 15,000 tons are maturing for a west-side highway in New York and a subway in Newark, N. J. Mississippi river improvement work at Rock Island, Ill., calls for 9600 tons of steel.

Pipe demands also open a more cheerful vista for 1932. A natural gas line from the Texas panhandle to Buffalo, projected by the Continental Construction Corp., Chicago, may take 200,000 tons, which would make it the largest pipe line order ever booked, though this still is in the formative stage depending on financing. A working agreement between Standard Oil of New Jersey and the Columbia Gas & Electric Corp. looks to the ultimate extension of a natural gas line from Pennsylvania into New England, which obviously would require a large tonnage of pipe. First quarter purchases of cast iron pipe by many municipalities will be formulated shortly in 1932 budgets. New York is expected to be in the market for 15,000 tons.

Railroad prospects also are a little brighter, and it is believed an adjustment of the roads' financial and wage problems will greatly improve their status as steel consumers. Indeed, steelmakers at Chicago now look to the railroads rather than to the automotive industry to lead steel back to another era of substantial business. Some of the Van Sweringen roads will be in the market earlier than expected for 1932 rail needs, the Erie inquiry nearing.

While the steelworks operating rate for the country as a whole was depressed in the week ended Dec. 26 to 15-20 per cent, this takes into account the holiday shutdown in many mills from Friday to Monday. A year ago the Christmas week rate was 30 per cent. Because many mills do not observe the New Year holiday the operating rate may snap back to about 24 per cent or to where it was before Christmas. Relatively, the low rate this year is less depressing than a year ago, as the steel trade now is convinced it has reached bottom, and while not anticipating a sharp comeback confidently expects the long trend to be toward improvement.

Tonnage demands from the automotive industry still are postponed. While it seems definitely established Ford has decided to bring out an 8-cylinder model in January, he has not yet issued substantial releases, and with this leading low-price manufacturer delaying, others in the same field are holding back.

Weakness has spread throughout the entire sheet and strip price structure. Concessions up to $3 a ton on sheets are offered on attractive business, chiefly from automobile manufacturers. Furniture sheets have been reduced $2 a ton. Cold-rolled shafting is off $2; track bolts are down $3 at Chicago. Carbon bars now are 1.55c to 1.60c, Pittsburgh, a downspread of $1 a ton. A further reduction of $1 a ton has been made in sheet bars, billets and slabs.

Due to a reduction of $3 a ton in hot-rolled sheets, STEEL'S finished steel price composite is down 30 cents to $47.52 and the iron and steel composite is off 12 cents to $30.16. The steelworks scrap composite is 2 cents lower, at $8.12.

Composite Market Averages

	Dec. 26	Dec. 19	One Month Ago (Nov., 1931)	Three Months Ago (Sept., 1931)	One Year Ago (Dec., 1930)	Ten Years Ago (Dec., 1921)
Iron and Steel Composite	$30.16	$30.28	$30.61	$31.03	$31.74	$33.99
Finished Steel Composite	47.52	47.82	48.17	48.72	49.30	51.30
Steelworks Scrap Composite	8.12	8.14	8.22	8.82	10.77	11.44

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, pipe, tin plate, nails, sheets, plates, shapes, bars. **Finished Steel Composite:**—Plates, shapes, bars, hot strip, nails, tin plate, pipe. **Steelworks Scrap Composite:**—Melting steel, compressed sheets.

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	Dec. 26, 1931	Nov. 1931	Sept. 1931	Dec. 1930
PIG IRON				
Bessemer, del. Pittsburgh	$17.26	17.76	18.26	18.76
Basic, valley	15.00	15.00	17.00	17.00
Basic, eastern del. eastern Pa.	16.00	16.00	16.65	17.50
No. 2 foundry, del. Pittsburgh	17.26	17.76	18.26	18.26
No. 2 foundry, Chicago	16.50	17.00	17.50	17.50
*Southern No. 2, Birmingham	12.00	12.00	12.00	14.00
**No. 2X, Virginia furnace	18.00	18.00	18.15	18.25
**No. 2X, Eastern del., Phila.	15.76	16.01	17.26	18.26
Malleable, valley	16.00	16.50	17.00	17.50
Malleable, Chicago	16.50	17.00	17.50	17.50
Lake Superior, charcoal, del. Chi.	20.04	25.04	25.54	27.04
Gray forge, del. Pittsburgh	16.63	17.13	17.63	17.63
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	93.29

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.25	2.35	2.40	2.50
Connellsville foundry, ovens	3.25	3.25	3.25	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	27.00	29.00	29.00	30.50
Sheet bars, open-hearth, Pitts.	28.00	29.00	29.00	30.50
Billets, open-hearth, Pittsburgh	29.00	29.00	29.00	30.50
Wire rods, Pittsburgh	35.00	35.00	35.00	35.50

	Dec. 26, 1931	Nov. 1931	Sept. 1931	Dec. 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.60
Steel bars, Chicago	1.60	1.70	1.70	1.70
Steel bars, Philadelphia	1.89	1.89	1.89	1.89
Iron bars, Chicago	1.60	1.65	1.70	1.70
Shapes, Pittsburgh	1.50	1.60	1.60	1.60
Shapes, Philadelphia	1.69½	1.69½	1.76	1.76
Shapes, Chicago	1.60	1.70	1.70	1.70
Tank plates, Pittsburgh	1.50	1.60	1.60	1.60
Tank plates, Philadelphia	1.73½	1.73½	1.80½	1.80½
Tank plates, Chicago	1.60	1.70	1.70	1.70
Sheets, No. 10 blue anneal., Pitts.	1.85	1.85	1.85	1.90
†Sheets, No. 24, hot, ann., Pitts.	2.25	2.40	2.40	2.35
Sheets, No. 24, galvan., Pitts.	2.90	2.90	2.90	2.90
Sheets, No. 10 blue anneal., Chi.	2.00	2.00	2.00	2.15
†Sheets, No. 24, hot, ann., Chi.	2.45	2.55	2.55	2.50
Sheets, No. 24 galvan., Chi.	3.05	3.05	3.05	3.15
Plain wire, Pittsburgh	2.20	2.20	2.20	2.25
Wire nails, Pittsburgh	1.90	1.90	1.90	1.90
Tin plate, per base box, Pitts.	4.75	4.75	5.00	5.00

†Comparisons are with old classification No. 24 black sheets.

SCRAP				
Heavy melting steel, Pitts.	$10.25	10.25	10.80	13.75
Heavy melting steel, eastern Pa.	7.50	7.95	8.75	11.00
Heavy melting steel, Chicago	7.50	7.65	7.95	10.00
No. 1 wrought, eastern Pa.	9.50	9.50	9.75	13.50
No. 1 wrought, Chicago	7.25	8.00	8.00	10.00
Rails for rolling, Chicago	10.00	10.00	10.50	13.00

Sheets

Sheet Business Promises Mild Impetus for Mills in January—Prices Continue Irregular

SHEET PRICES, PAGE 41

Cleveland—Republic Steel Corp., Youngstown, O., at 2.60c, delivered, Columbus, O., has taken 1100 tons of No. 24 gage, pickled cold-rolled annealed stock, 28 x 84 inches, to be used for Ohio license plates. Other bids in order were: Wheeling Steel Corp., Wheeling, W. Va., 2.62c; Wilson Mfg. Co., Niles, O., 2.63c; Reeves Mfg. Co., Dover, O., 2.65c; Continental Steel Corp., Kokomo, Ind., 2.63c; Canton Tin Plate Corp., Canton, O., 2.68c; Empire Steel Corp., Mansfield, O., 2.76c; Youngstown Sheet Metal Co., Youngstown, O., 2.77c; Apollo Steel Co., Apollo, Pa., 2.78c; American Sheet & Tin Plate Co., Pittsburgh, 2.795c; Newport Rolling Mill Co., Newport, Ky., and Youngstown Sheet & Tube Co., Youngstown, O., both 2.81c; Union Iron & Steel Co., 2.86c; American Rolling Mill Co., Middletown, O., 2.895c; Mahoning Valley Steel Co., Youngstown, O., and Follansbee Bros. Co., Pittsburgh, 2.91c; Superior Sheet Steel Co., Canton, O., 2.96c; Weirton Steel Co., Weirton, W. Va., 3.06c; and Highway Construction Co., Cleveland, 3.09c.

The tone of the market improved last week. An accumulation of small orders for quick shipment came to the mills just before Christmas and a survey of important sheet consumers down state revealed an increase in operations. Heavy and light furniture sheets have been cut $2 to 2.65c, Pittsburgh, for No. 10 heavy gage, and to 3.25c on No. 20 light gage. Galvanized are firm at 2.90c, Pittsburgh. Autobody sheets are under pressure from seconds.

New York—While concessions still are offered, the tone of the market appears a little firmer than a week ago. Bids close Jan. 4 at Washington on No. 10 and 18 sheets for Panama, also plates and miscellaneous material.

Philadelphia — Sheet demand is quiet. Only on No. 10 hot-rolled do concessions appear sufficiently important to receive market recognition.

Pittsburgh — Sheet orders have moderated recently but are close to the average for the preceding 60 days. Automotive business is spotty and the date of appearance of Ford orders still is problematical. Mills have accumulated a moderate volume of orders for January shipment, although this business will give only a mild impetus to operations next month. Prices continue slightly irregular, with occasional concessions.

Youngstown, O.—Sheet mills have suspended or slowed up operations for the holidays. Many will not resume until after New Year's day. Repairs will be made in the interval. New business in common black and autobody sheets is especially slow. Buying in volume for first quarter has not started. The automotive industry is proceeding cautiously. Enameling and stamping industries are issuing some specifications. Galvanized sheets are being purchased for roofing purposes. Buyers generally are paying 2.40c, Pittsburgh, for black sheets; 2.90c for galvanized; and 3.00c for autobody.

Cincinnati—Inquiry for sheets for the first quarter has improved moderately. Releases from the automotive industry continue to lag.

Chicago — Bids were scheduled Dec. 28 on 300 tons of sheets for Kansas automobile license plates. About 1500 tons of sheets are pending for the Chicago post office. Prices in competitive bidding show steadiness. Sales of No. 24 hot-rolled have been closed at 2.50c, mills. A spurt in orders was noted last week for shipment Dec. 31.

St. Louis—Demand for galvanized sheets is not showing the usual seasonal improvement in the agricultural areas. Other consumers are holding down shipments until after inventory.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

HOT ROLLED No. 10

Pittsburgh, base	1.65c to 1.70c
Gary, Ind. Harbor, base	1.75c to 1.80c
Chicago, del.	1.80c to 1.85c
Philadelphia, del.	1.94c to 1.99c
Birmingham, base	1.85c

BLUE ANNEALED NO. 9-10

Pittsburgh, base	1.85c
Chicago, district mills	1.95c
Chicago, delivered	2.00c
Philadelphia, del.	2.14c
St. Louis, delivered	2.20½c
Birmingham	2.00c
San Francisco c.i.f.	2.33c

***HOT ROLLED ANNEALED NO. 24**

Pittsburgh, base	2.25c to 2.40c
Gary, Ind. Harbor, base	2.40c to 2.50c
Chicago, del.	2.45c to 2.55c
Philadelphia, del.	2.59c to 2.69c
Birmingham, base	2.45c to 2.55c
St. Louis, del.	2.75½c
San Francisco, c.i.f.	2.88c

GALVANIZED NO. 24

Pittsburgh, base	2.90c
Gary, Ind. Harbor, base	3.00c
Chicago, del.	3.05c
Philadelphia, base	3.19c
Birmingham, base	3.05c
St. Louis, del.	3.25½c
San Francisco, c.i.f.	3.38c

***AUTOMOBILE NO. 20**

Pittsburgh, base	2.90c to 3.00c

FURNITURE

Pitts., No. 10 heavy	2.65c
Pitts., No. 20 light	3.25c

TIN MILL BLACK NO. 28

Pittsburgh, base	2.55c to 2.65c
Gary base	2.65c to 2.75c
St. Louis, del.	3.00½c

***HEAVY COLD ROLLED NO. 10**

Pittsburgh base	2.25c to 2.35c
Gary, Ind. Harbor, base	2.35c to 2.45c
Chicago, del.	2.40c to 2.50c
Philadelphia, del.	2.54c to 2.64c
St. Louis, del.	2.70½c

***COLD ROLLED NO. 20**

Pittsburgh, base	2.85c to 2.95c
Gary, Ind. Harbor, base	2.95c to 3.05c
Chicago, del.	3.00c to 3.10c
Philadelphia, del.	3.14c to 3.24c
St. Louis, del.	3.30½c

*Lower prices have been applied on large tonnages of special sizes.

Tin and Terne Plate

Prices per 100-pound box Pittsburgh

Tin plate, coke base	$4.75

Gary, Ind., base 10 cents higher
Long ternes, 24, unassorted, 3.05c to 3.15c

Wire Products

For First Quarter

(Prices apply on straight carloads. Mixed and joint carloads take 10 cents higher price; pool carloads 25-cent advance; less carloads 40-cent advance.)

F.o.b. mills, 100 lb. keg

Standard wire nails	$1.95
Cement coated nails	1.95
Galvanized nails	3.95

(Per pound)

Polished staples	2.50c
Galvanized staples	2.75c
Barbed wire, gal.	2.60c
Annealed fence wire	2.35c
Galvanized wire	2.80c
Woven wire fencing, (9-11 ga.)	$55.00
(12½ ga. and lighter)	$60.00

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind. Chicago, $1 over Pitts-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Steel Plates

Pittsburgh, base	1.50c to 1.60c
Philadelphia, del.	1.73½c to 1.78½c
New York, delivered	1.83c to 1.88c
Boston, delivered	1.95c
Chicago, base	1.60c to 1.70c
Cleveland, del.	1.78½c
Lackawanna, N. Y., base	1.60c to 1.70c
Birmingham, base	1.75c
Coatesville, Pa., base	1.65c to 1.70c
Pacific Coast, c.i.f.	1.80c to 1.85c
St. Louis, del.	1.95½c

Structural Shapes

Pittsburgh, base	1.50c to 1.60c
Philadelphia, del.	1.69½c
New York, del.	1.75¼c to 1.80¼c
Boston, del.	1.88½c to 1.93½c
Chicago, base	1.60c to 1.70c
Cleveland, delivered	1.68½c to 1.78½c
Lackawanna, N. Y., base	1.60c to 1.70c
Birmingham, base	1.75c
Pacific Coast, c.i.f.	2.05c
Do, wide flange	2.15c

Bars

SOFT STEEL

Pittsburgh, base	1.55c to 1.60c
Chicago, base	1.60c to 1.65c
Birmingham, base	1.70c to 1.75c
Lackawanna, N. Y., base	1.65c to 1.70c
Pacific coast, c.i.f.	2.05c
Cleveland, base, local del.	1.65c
Cleveland base, out. del.	1.65c
Philadelphia, del.	1.84c to 1.89c
New York, del.	1.89c to 1.93c
Boston, del.	1.95c to 2.00c
Pittsburgh, cold finish	1.85c
Pittsburgh, forg. qual.	1.90c

RAIL STEEL

Chicago Heights	1.50c to 1.60c
Eastern mills	1.30c
Pittsburgh	1.30c to 1.35c

IRON

Chicago, base	1.60c to 1.65c
New York, delivered	1.88c to 1.98c
Philadelphia, delivered	1.84c to 1.94c
Pittsburgh, refined	2.70c to 4.20c

REINFORCING

Pitts., billet cut lengths	1.75c
Stock lengths, mill	1.60c
Chi., billet	1.75c to 2.00c
Chi., rail steel	1.55c to 1.70c
Chi., rail steel, bridges and culvert	1.40c to 1.50c
Philadelphia, cut lengths	2.04c
Cleveland, cut lengths	1.75c

Cold Finished Bars, Shafting

Base Pittsburgh, Chicago, Buffalo and Cleveland	2.00c
Shafting, turned and ground, Pittsburgh, Cumberland, Md.	2.35c to 2.80c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold strip	25c	26.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to 6.75 off
Carloads, Chicago dist.	7.00 to 7.50 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bars, 2.65c, mill

S.A.E.	Alloy Diff.	
2000	0.25	4600 .20 to .30 Mo. 1.25-1.75 Ni. 1.05
2100	0.55	5100 .80 - 1.10 Cr. 0.45
2300	1.50	51.00 Cr. spring 0.20
2500	2.25	6100 bars 1.20
3100	0.55	6100 Spring 0.95
3200	1.35	Cr., Ni., Van. 1.50
3300	3.80	Carbon Van. 0.95
3400	3.20	9250 (flats) 0.25
4100 .15 to .25 Mo.	0.50	9250 (rds.,sq.) 0.50

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.55c to 1.60c
Do, 6 1/16 to 24-in., Pitts.	1.45c to 1.50c
Hot strip to 6 in. Chi.	1.70c
Do, 6 1/16 to 24 in.	1.60c
Cooperage hoop, Pitts.	1.70c to 1.80c
Do., Chicago	1.85c to 1.95c
Cold rolled strip, Pitts., Cleve	2.05c
Worcester, 3 tons, over	2.20c

Rails, Track Material

Standard rails, mill	$43.00
Relay rails, Pitts., 20 to 45 lbs.	$22.00 to $26.00
50 to 75	20.00 to 24.00
80 to 100	24.00 to 27.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, mills	2.75c
Spikes, railroad, mills	2.60c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.60c
Spikes, boat, barge, Pitts.	2.90c
Track bolts, Pitts., steam	3.80c
Do, standard, jobbers	73 off list
Track bolts, Chicago	3.50c
Tie plate, mills	$37.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread.....73, 10 and 10 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list .....73, 10 and 10 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts .....73, 10 and 10 off
Tire bolts .....60, 10 and 10 off
Stove bolts, 80-25-10 off in pkgs.; 80 25-10-2½ off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished .....73, 10 and 10 off

HEXAGON CAP SCREWS

Milled .....80-10-10-5 off
Upset 1 in. diam. and smaller....85-10 off

SQUARE HEAD SET SCREWS

Milled .....80-5 off
Upset 1 in. and smaller .....80-10-5 off
Upset, larger than 1 in.....80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l. Pittsburgh.....2.50c
Do. less carloads, 5 kegs or over..2.75c; less than 5 kegs, 2.90c.
Chain, BB, BBB, 9/16-1½ in....33 1/3 off
Sheet piling, Pitts. 1.90c

Rivets

Struc., c.l., Pitts.-Cleve.	2.25c
Struc., c.l., Chicago	2.35c
7/16-in. smaller, Pitts.	70, 10 and 5 off
Chicago, Cleve.	70, 10 and 5 off

Bars

Market More Active at Chicago —Demand for Railroad Repairs Heavier—Tone of Market Easy

BAR PRICES, PAGE 41

Chicago—Both specifications and sales of merchant bar and other heavy finished products gained moderately in the past week. Western partsmakers are renewing 1931 contracts with automotive builders, but partsmakers' specifications for finished steel have been spotty. Mills will make no further announcement of first quarter prices, and the range of 1.60c to 1.70c, Chicago, applies on business being booked for January. Railroad shop orders for repairs to equipment are larger.

New York—With prices unchanged at 1.60c, Pittsburgh, for first quarter, and with weakness indicated, consumers of steel bars are contracting slowly. Common iron bars are quiet at 1.60c to 1.70c.

Philadelphia—Steel bar prices are untested at 1.60c, base, Pittsburgh.

Pittsburgh—Although steel bar producers have opened first quarter books at 1.60c little new business is appearing and the tone of the market is slightly easy. Specifications show their usual year-end decline.

Cleveland—Last week saw orders practically absent for merchant steel bar sizes, and shipments greatly curtailed. The 1.65c Cleveland base for both deliveries is holding, and contract coverage for first quarter has been so light that the price has not yet been set.

Bolt, Nut, Rivet Buying For First Quarter Starts

Bolts, Nuts, Rivets Prices, Page 41

Pittsburgh — First quarter contracting for bolts, nuts and rivets continues fairly active, while specifications hold at their recent quiet rate. Only a slight decline is noted in total business from the November volume. Prices continue 73, 10 and 10 off for bolts and nuts and 2.25c for large rivets.

New York—Bolts and nuts are easy at 73 and two 10's off, with no large orders reported. Rivets are firmer than bolts and nuts, still holding at 2.25c, Pittsburgh.

Chicago — Automotive specifications have helped support the market. Implement works are getting closer to production plans for next year, although it is indicated activity will be light for the first 60 days. Rivet prices are steady. Some of the weakness has disappeared in the 73, 10 and 10 discounts for bolts and nuts.

Tin Plate Contracting Practically Completed

Tin Plate Prices, Page 41

Pittsburgh—Tin plate operations were curtailed during the past week as a result of the holiday although output during the first half of the week continued around 45 per cent. Mills still have some backlogs. Contracting for the first half is practically complete, the market continuing $4.75, Pittsburgh, per base box.

New York—One of the two larger consumers of tin plate, who have delayed in contracting for future requirements, is expected to act shortly.

Cold-Finished Shafting Is Reduced $2 a Ton

Cold Finished Prices, Page 41

Pittsburgh—Turned and ground shafting has been reduced $2 a ton to 2.35c-2.80c, Pittsburgh or Cumberland, Md., in line with a similar reduction in cold-finished bars. Better activity is looked for in January and although some orders are at hand for future shipments the volume is light.

Cleveland—Sales did not expand last week, and dullness in demand is discounted for the rest of the holiday period. The market is 2.00c, Cleveland.

Industrial relations program of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., was awarded one of four capital prizes in a recent contest by B. C. Forbes, business writer.

Plates

Books Opened for First Quarter at Unchanged Prices—Current Sales and Contracting Light

PLATE PRICES, PAGE 41

New York—Plate sellers in some instances are quoting 1.70c, Coatesville, Pa., for first quarter. Eastern mills are figuring on 2500 tons of 36 and 60-inch steel pipe for Buffalo, bids on which were opened Dec. 22.

Philadelphia — Pending further clarification the plate market here apparently is 1.65c to 1.70c, Coatesville, Pa. Trading is at a low ebb.

Pittsburgh—Plate orders are small. Producers have opened books for the first quarter at 1.60c, Pittsburgh, but contracting is light, and in view of lower prices developed recently the market remains to be established at the announced level.

Cleveland—No important plate tonnages are being withheld on account of price dissatisfaction, and 1.60c, Pittsburgh, continues on small orders. Interest is centering on the steel in the Rock Island, Ill., lock and dam on the Mississippi river, on which S. A. Healy Inc., Detroit, is low at $3,326,972. Fair requirements are anticipated for road machinery builders late in January.

Chicago—Several municipal tank orders have been booked, but the oil tank market is quiet. Plates for bridges constitute the chief specifications. Quotations are nominal at 1.60c to 1.70c, mills.

Contracts Placed

355 tons, 44-inch steel pipe, Newark, N. J., reported placed with East Jersey Pipe Co.

300 tons, fabricated platework for St. Nicholas coal breaker, awarded to unstated by Stone & Webster, New York.

150 tons, plates for municipal tank at Rhinelander, Wis., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

Contracts Pending

2500 tons, 36 to 60-inch steel pipe, Buffalo, bids opened Dec. 22.

160 tons, tanks for New York, contract awarded to Buffalo Tank Corp., Buffalo, N. Y.

Unstated, although relatively small tonnage, barge, department of docks, New York city, United Dry Docks Inc. low.

Canadian Car & Foundry Co. Ltd., Montreal, Que., had reduced its common dividend to the annual basis of $1, having declared a quarterly of 25 cents as compared with 44 cents per quarter previously.

Railroads

Western Fastening Prices Revised—Car Buying Absent—Rail Mills Under 20 Per Cent

TRACK MATERIAL PRICES, PAGE 41

Chicago—Several adjustments are being made in track material prices. Railroad spikes are generally 2.60c, mills, instead of 2.60c to 2.80c, and track bolts are down to 3.50c, mills, as against 3.80c. Angle bars hold at 2.75c. About 1200 to 1500 tons of heavy finished steel, chiefly light structurals and plates, are being specified by Chicago Great Western for repairs to 500 freight cars. Northern Pacific is rebuilding 3000 freight cars at a cost of $4,500,000. Freight car shops are confident wage adjustments and the new Railroad Credit Corp. will provide sufficient revenue for railroads to place moderate rolling stock orders next year. The 300 underframes for Western Fruit Express and 150 hopper cars for Northern Pacific are the only inquiries before the market. The 1932 rail buying still is deferred. Miscellaneous releases and exercise of options have kept rail mills operating at about 20 per cent.

New York—Demand for rolling stock continues negligible, with chief interest centering on first quarter steel requirements of the carriers.

Pittsburgh—Railroads are marking time in steel purchases while new inquiry is lacking. Action on recent inquiries of several roads for first quarter requirements will be taken shortly. The Louisville & Nashville railroad has closed with a southern mill for fastenings.

Cleveland — Although somewhat easier than anticipated several weeks ago, there appears indication that the Erie railroad's inquiry for 1932 rails will be issued sometime this week. The tonnage is as yet unknown but will probably be considerably less than the 41,748 tons for 1931, placed among Carnegie, Illinois, Bethlehem and Inland Steel mills. Award has been made by the Chesapeake & Ohio for repairs to 352 cars to the Standard Steel Car Co., Pittsburgh.

Car Orders Placed

Chesapeake & Ohio, repair parts to 352 cars, to Standard Steel Car Co., Pittsburgh.

Monsanto Chemical Works, 11 tank cars, to American Car & Foundry Co., New York.

Locomotives Placed

Department of Purchase, New York, one gasoline locomotive to Midwest Locomotive Works, Hamilton, O.

Howell Machine Works Inc., 108 North Jefferson street, Chicago, has changed its name to Howell Maisch Mfg. Co.

Wire Shipments Shrink And Buying Is Light

Wire Prices, Page 41

Chicago—Wire producers encounter no resistance to the new price basis announced for first quarter, but contract interest still is light. Specifications in the last week have been negligible. A few contracts for plain wire have been made at 2.25c, Chicago or western mills, for plain wire. Jobbers and dealers have reduced merchant stocks appreciably in the last month.

New York—Trading in nails and other wire products is dull, with recently announced prices still largely untested.

Pittsburgh—Producers of wire products have accumulated some orders for shipment prior to Jan. 15 as a result of higher prices effective on first quarter contracts. December shipments show a marked decrease from the November rate. First quarter contracting is fairly active on the new price basing system.

Semifinished Steel Prices Are Lower

Semifinished Prices, Page 48

Pittsburgh — Little contracting is noted for semifinished steel. Some business for early January shipment is being received in wire rods as a result of the $2 a ton advance. Specifications against old contracts are being received until Dec. 31 for shipment by Jan. 15. Producers are quoting $28, Pittsburgh, on sheet bars, and $29 on billets and shapes, with no change announced for first quarter. Forging billets continue $35.

Youngstown, O.—District mills have not yet named prices on billets, sheet bars and slabs for first quarter. While the present nominal quotation on billets and slabs is $29, Youngstown and Pittsburgh, sheet bars have been reduced to $28.

Chicago—Semifinished steel shipments have slowed. Several contracts have been closed for first quarter at $30, Chicago, for billets and blooms, 4 x 4-inch base, and sheet bars. Prices of forging billets range from $35 to $36, Chicago.

Iron Ore Stocks Down; Consumption is Slower

Iron Ore Prices, Page 48

Cleveland—Stocks of Lake Superior iron ore at lower lake ports and at furnaces Dec. 1, amounting to 39,232,150 tons, were 1,994,656 tons less than on Dec. 1, 1930, according to the Lake Superior Iron Ore association. This would be gratifying to the ore producers were it not for the fact that consumption is at a much slower rate than a year ago. Consumption in November, 1930 was 2,639,836 tons; in November this year, 1,311,212 tons. The latter was 139,962 tons less than in October. The market is quiet.

Coke By-Products Demand Expected To Increase

New York—Distillates are firm. Some distributors have limited supplies to meet the expected increase in demand in January. Phenol is unchanged. Little current business is noted in naphthalene, although refiners have a fair volume booked for first quarter. Sulphate of ammonia is weak. Imports for New Jersey and Norfolk through New York last week totaled several thousand tons.

November Hoist Business Showed Sharp Decline

New York—Members of Electric Hoist Manufacturers' association report that the number of hoists ordered during November decreased 36.875 per cent as compared with the previous month. Value of such orders decreased 24.77 per cent as compared with October. Shipments were 8.857 per cent greater in November than in October.

Shell Forgings Awarded

New York—Lansdowne Steel & Iron Co. has been awarded 121,700 steel projectile shell forgings, 3-inch, for the Frankford Arsenal, Pa., bidding 54.95c each. These forgings weigh approximately 6½ pounds each, a total of close to 400 tons of steel forgings. Bids opened Dec. 3.

Structural Shapes

Awards Headed by 16,000-Ton Postoffice, 12,000-Ton Elevated—Contractors Named on Rock Island, Ill., Work — Week's Contracts Largest Since Sept. 24

STRUCTURAL SHAPE PRICES, PAGE 41

New York—Lettings are heavier, although few in number. For the First National bank, 3300 tons went to Post & McCord, sections to be fabricated by American Bridge Co. Fresh inquiry is light, but includes 1600 tons for three city schools. About to be placed is 15,000 tons, west side highway and the Newark subway sections. Cauldwell-Wingate Co. is low on the department of health building, 2500 tons. Allen N. Spooner & Sons are low on the 107th street pier, Harlem river, which will give the buyer five city pier contracts. If plain material prices for the first quarter at 1.70c, eastern mill, are firmly held, this would be equivalent to an increase.

Boston—Lettings and new inquiry are light, although a number of small jobs going over into 1932 brings the total pending to a fair tonnage. F. V. Warren Co., Philadelphia, has the contract for the public works building, plans having been revised reduce the steel requirements. American Architecture Iron Works booked a school at Roslindale. State hospital work pending includes several jobs taking between 100 and 200 tons each.

Philadelphia — Shape producers generally are not declaring definitely their position for first-quarter. Consumers are showing little interest. Current price is nominally 1.65c, nearest mill on carlots. Lettings are small and scattered.

Pittsburgh—Structural shapes for the postoffice and federal building here, involving 16,000 tons, are understood to have been tentatively placed with a local fabricator. First-quarter books have been opened at 1.60c, Pittsburgh, for plain shapes although the market range continues 1.50c to 1.60c.

Cleveland—Although over 50 state bridge and roadwork projects are going in Dec. 29 for contractor bids, the only one of size requiring structural steel is for 114 tons of steel beams for a bridge in Clark county. The $100,000 Cornell university building, general contract on which has been placed with Crowell & Little, Cleveland, will take only about 30 tons of structural. An Akron, O., fabricator is reported to have closed on the local Goodyear building, 150 tons. Plain material is being carried over into first quarter at unchanged price levels.

The Columbus, O., baseball park, about 550 tons, has been postponed.

Chicago—S. A. Healy Inc., Detroit, is low on the general contract for government locks and dam in the Mississippi river at Rock Island, Ill., at $3,326,972, the engineer's estimate having been $3,950,068. Purchase of 3000 tons of structural steel and plates for the roller dam and gates, 1000 tons of steel piling and 600 tons of castings will be made as soon as the general contract is awarded. Plain material prices are based on 1.60c, mill. Awards total 7000 tons, and active inquiries are 5100 tons.

St. Louis—Fabricators of structural steel report a dearth of lettings, and further curtailment in working forces has taken place the past two weeks. Unfinished orders are declining, and unless new business appears, activities at a number of plants will be suspended. The only letting of consequence last week was 2500 tons of sheet steel piling by the Callahan Construction Co., St. Louis, general contractors for Madden dam, Panama Canal zone, to Bethlehem Steel Export Corp., New York.

Birmingham, Ala.—Structural inquiries are more numerous. Most shops resumed this week, after being down since Christmas.

Contracts Placed

16,000 tons, postoffice and federal building, Pittsburgh, to Fort Pitt Bridge Works Co., Pittsburgh, through Aronberg-Fried Co., Cleveland and New York, contractor.

12,000 tons, West Side elevated highway, Twenty - second to Thirty - eighth streets, Manhattan, New York, to McClintic-Marshall Corp., Bethlehem, Pa., through Porier & McLane, contractors.

3300 tons, office and bank building, First National bank, Wall street and Broadway, New York, to Post & McCord, New York; steel to be fabricated by American Bridge Co., Pittsburgh; Marc Eidlitz & Son, contractor.

2500 tons, piling, Madden dam, Panama canal, to Bethlehem Steel Export Corp., New York, through Callahan Construction Co., St. Louis.

1650 tons, two bridges, Joliet, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

1200 tons, bridges for Illinois highway commission, to Clinton Bridge Works, Clinton, Iowa.

1000 tons, bascule bridge, Cass street, Chicago, for division of waterways, to Independent Bridge Co., Pittsburgh.

850 tons, bridge over White river, Crossville, Ill., to International Steel & Iron Co., Evansville, Ind., through A. Guthrie & Co. Inc., Chicago.

880 tons, lock and dam gates, Harvey, La., for United States engineers, to Hardie-Tynes Mfg. Co., Birmingham, Ala.

775 tons, pier shed, Brooklyn, N. Y., to unstated fabricator.

700 tons, bridges, Maryland, Pennsylvania railroad, contract 31-1931, to American Bridge Co., Pittsburgh; bids Dec. 8.

550 tons, addition, Bowery Savings bank, New York, to McClintic-Marshall Corp., Bethlehem, Pa.; Marc Eidlitz & Son, contractors.

380 tons, hospital, Lakeland, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.

380 tons, Pittsburgh & West Virginia railroad bridge, Allegheny county, Pa., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, veterans' hospital, Columbia, S. C., to Decatur Iron & Steel Co., Decatur, Ala., through S. X. Barstow & Co., Reading, Pa., contractor.

300 tons, municipal freight transit shed, Trenton, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, bridge for Nickel Plate railroad, to American Bridge Co., Pittsburgh.

260 tons, state highway bridges, Michigan, to Fort Pitt Bridge Works Co., Pittsburgh.

250 tons, building, Vermont Marble Co., Proctor, Vt., to Lackawanna Steel Construction Corp., Buffalo.

250 tons, highway bridge, Marseilles, O., to International Steel & Iron Co. Evansville, Ind.

250 tons, bridge, Hamilton street, Allentown, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.; George H. Hardner, Allentown, contractor.

250 tons, viaduct, Orange hill, Long Beach, Calif., to Consolidated Steel Corp., Los Angeles.

250 tons, bridge in Williamson county, Ill., to Vincennes Bridge Co., Vincennes, Ind.

200 tons, cracking unit, Whiting, Ind., to McClintic-Marshall Corp., Bethlehem, Pa., through M. W. Kellogg Co.

200 tons, office building, St. Paul, to St. Paul Structural Steel Co., St. Paul.

150 tons, building, Cleveland, for Goodyear Tire & Rubber Co., Akron, O., to Burger Iron Co., Akron, O.

150 tons, three-story building, Brevoort Savings bank, Brooklyn, N. Y., to

Awards Compared

	Tons
Awards, week ended Dec. 26	**45,520**
Awards, week ended Dec. 12	**19,815**
Awards, week ended Dec. 5	**19,047**
Awards, this week in 1930	**14,635**
Av. weekly awards, 1930....	**35,242**
Av. waakly awards, 1931....	**34,236**
Av. weekly awards, Nov....	**17,984**
Total awards, 1930.....	**1,832,601**
Total awards, 1931	**1,780,263**

George A. Just Co., Long Island City, N. Y.

145 tons, Maine Central railroad bridge, Carmel, Me., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, shapes and bars, state school, Newark, Del., to Bethlehem Fabricators Inc., Bethlehem, Pa., and Truscon Steel Co., Youngstown, O.; William M. Francis Co., Wilmington, Del., contractor.

Contracts Pending

4100 tons, Manheim road bridge, Chicago; bids in on general contract.

3000 tons, structural steel plates and steel piling for government locks and dam No. 15, Mississippi river, at Rock Island, Ill., S. A. Healy Inc., Detroit, low on general contract at $3,326,972.

1600 tons, three public schools, New York, No. 16, bids in; Nos. 19 and 163, bids Dec. 29.

1500 tons, postoffice, Topeka, Kans.

1050 tons, highway bridge, Trenton, N. J.

750 tons, bridges for Indiana highway commission.

730 tons, wharf, New Orleans.

700 tons, bridge for Illinois highway commission.

700 tons, Mississippi river dam at New Orleans.

600 tons, high school, Milton, Del.; F. V. Warren, Philadelphia, contractor.

550 tons, two state highway bridges, West Virginia.

550 tons, highway bridge, Shoals, Ind.

550 tons, baseball park, Columbus, O.; indefinitely postponed.

500 tons, Milwaukee country nurses' home, Milwaukee; Worden-Allen Co., Milwaukee, low; project probably to be readvertised on revised specifications.

500 tons, building, Sears, Roebuck & Co., Buffalo.

450 tons, high school, Battle Creek, Mich.

450 tons, two bridges near Milwaukee, for Chicago & North Western railroad.

440 tons, highway bridge, Butler, Wis.

400 tons, two state highway bridges, Georgia.

200 tons, postoffice, Youngstown, O.; bids close on general contract Dec. 28.

114 tons, bridge, Clark county, O., for Ohio state highway department, Columbus, O.; bids Dec. 29. Thirty-five tons reinforcing bars in same project.

100 tons, building, state hospital, Wrentham, Mass.; Crane Construction Co., Boston, contractor.

Labor Accession Rate Highest Since March

Washington—Labor turnover for November, as reported to the bureau of labor statistics, reflects favorable indications. In manufacturing the accession rate was 3.63, the highest since March. The separation rate was 3.92, lowest since August. Of the ten industries for which separate figures are reported, automobiles had the highest accession rate, 16.51, this occurring after the middle of the month. The lowest discharge rate for the month occurred in the iron and steel industry.

Concrete Bars

New York Buyers Still Defer — Await Contractor Award on Rock Island, Ill., Dam, 5000 Tons—Shipments on Old Orders Steady at Pittsburgh—$2 Cuts Noted

REINFORCING BAR PRICES, PAGE 41

New York—Pending tonnage in concrete bars indicates a liklihood of heavier lettings soon. Buyers are slow to close on considerable work for which general contracts have been placed. A sewer on the West side is being readvertised for Jan. 4, taking several hundred tons. Prices on small lots are steady at 1.93c, but concessions up to $2 a ton have been made on larger contracts. Bids go in this week on the Cohoes-Waterford bridge, about 285 tons.

Boston—Concrete reinforcing steel buying is sluggish. A fair volume is pending on which action drags slowly, mostly bridges and public work. Prices are unchanged and steady on small lots.

Philadelphia—Reinforcing bars are largely nominal at 1.60c, Pittsburgh, mill lengths. Little tonnage is in immediate prospect.

Pittsburgh—Concrete bar orders and inquiry are quiet and though shipments against old orders remain fairly steady little change in activity is looked for until January. The market is continued 1.60c, Pittsburgh.

Cleveland—Buying has subsided with the recent large local awards, although a state highway letting schedules for Dec. 29 will involve 56 different projects, most of which take reinforcing steel. However, the largest individual job does not call for more than 75 tons. Most of the work is to be in small concrete single span bridges.

Chicago—Award of 5000 tons of reinforcing bars for the Mississippi river locks and dam at Rock Island, Ill., will be closed in two to three weeks, bids having been tabulated on the general contract. Scattered road work contracts are being let, but building inquiry is lacking. Both billet and rail steel bar fabricators have stiffened quotations. For less-carload billet bar orders, 2c is asked.

Awards Compared

	Tons
Awards, week ended Dec. 26	600
Awards, week ended Dec. 12	5,700
Awards, week ended Dec. 5	6,120
Awards, this week in 1930	664
Av. weekly awards, 1930..	6,990
Av. weekly awards, Nov.....	6,358
Av. weekly awards, 1931....	6,898
Total awards, 1930	363,479
Total awards, 1931	358,692

Contracts Placed

320 tons, viaduct, New York Central railroad, Eighteenth to Thirtieth streets, West Side, Manhattan, New York, to Joseph T. Ryerson & Son Inc., Chicago, through Corbetta Concrete Co.

280 tons, Illinois roadwork, to Concrete Steel Co., New York.

Contracts Pending

5000 tons, locks and dam, Rock Island Ill.; S. A. Healy Inc., Detroit, low on general contract.

800 tons, intercepting sewer, Twenty-second street, Chicago sanitary district; bids rejected.

649 tons, 36 bridge and highway projects, Ohio state highway department, Columbus, O.; bids Dec. 29.

200 tons, interior, Rosenwald museum, Chicago; indefinitely postponed.

110 tons, school, Greenport, N. Y.

100 tons, Monroe county building addition, Rochester, N. Y.; bids in.

Allis-Chalmers Is Low

Allis-Chalmers Mfg. Co., Milwaukee, is low bidder at $64,840 for furnishing and installing one 60,000,000-gallon geared turbine driven centrifugal pumping unit in the Riverside pumping station of the Milwaukee municipal water works, on bids opened Dec. 22. City engineering estimates on the pump were approximately $100,000. There were two other bidders, namely, Worthington Pump & Machinery Corp., $78,000, and DeLaval Steam Turbine Co., Trenton, N. J., $94,424.

Smelt Manganese with Gas

Domestic Manganese & Development Co., Butte, Mont., will experiment with the reduction of manganese ore by natural gas instead of coal. The plant, which has been idle since June, 1930, has a capacity of 350 tons of ore daily, output being said to average 57½ per cent metallic manganese.

Pipe

Texas-Buffalo Line May Take 250,000 Tons Steel Pipe—2000 Tons Cast Bought

New York—Close to 15,000 tons of cast pipe for yard stocks will be bought by New York city in first quarter, inquiry to follow one or two smaller lots to come out soon after Jan. 1. Utilities are not expected to purchase much in first half, some having failed to specify fully for 1931. Westchester county sewer work accounts for much of the current business. Prices are weak, $30 and under being noted for pipe delivered here.

Boston—Bids are in on about 675 tons for Hartford county metropolitan district. Some towns have bought pipe for spring delivery, but until 1932 funds are available, municipal buying is likely to be restricted. Prices are easy. Standard steel and wrought iron pipe demand is light, bulk of inquiry being for a few fair-sized heating jobs.

Pittsburgh—Orders for standard pipe are affected by seasonal influences. Market for line pipe continues dull. Oil country goods are slow and demand for mechanical tubing is receiving only light support from automotive industry.

Chicago—Promotion work has been started for the building of a natural gas pipe line from the Texas panhandle to Buffalo. Preliminary estimates are that 200,000 to 250,000 tons of steel might be required. Further details are lacking except that Continental Construction Co., Chicago, may build the line. Cast pipe is quiet. About 200 tons has been ordered by a local public utility company.

Cast Pipe Placed

2000 tons, 24-inch, Colorado Springs, Colo., to Colorado Fuel & Iron Co., Denver and Pueblo, Colo.

500 tons, 16-inch, West Nyack, N. Y., to Warren Foundry & Pipe Co., Phillipsburg, N. J., through A. S. Mundy Co., Woodbridge, N. J., contractor.

200 tons, 24 and 30-inch, sewer, section B, Sawmill project, Westchester county, N. Y., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

200 tons, 6 and 8-inch, to unstated for a Chicago utility company.

Cast Pipe Pending

2100 tons, 4 to 16-inch with fittings. Boston; bids Dec. 29. Included, 675 tons of boxes, gate and hydrant parts; bids Dec. 30.

250 tons, sewer, section R, sawmill project, Mamaroneck, N. Y.

Steel Pipe Pending

3575 tons, 8-inch steel oil line loop, 45 miles, Henryetta to Jenks Station, Okla., for Gulf Pipe Line Co., Pittsburgh. Work includes enlargement of pump station at Jenks Station, Company letting contract, pipe to cost about $400,000.

Unstated tonnage, extension of gas pipe lines through Mohawk valley to Troy-Albany, N. Y., area, for Standard Oil Co. of New Jersey and Columbia Gas & Electric Corp., both of New York, under joint agreement. Plans also call for lines to run into New England from the Troy-Albany district. A loop line will later connect New York state gas lines with those in the Newark-Philadelphia district.

Unstated tonnage, 43,000 feet, ¾ to 4-inch galvanized steel or wrought iron pipe, mostly 2-inch, Panama canal; bids Jan. 4.

Locomotive Unfilled Orders at Year's High

In spite of the slight gain October registered, November's shipments of railroad locomotives slumped to the second low of 1931 at only seven locomotives for the month. For the seventh month of 1931 there were no foreign shipments. Unfilled orders, however, compensated for the fall in shipments, for the former were at the highest level in 1931, according to department of commerce report:

	Shipments		Unfilled Orders	
1930	Domestic	Foreign	Domestic	Foreign
Nov.	43	.....	88	5
11 mo.	695	19	.....	.....
Dec.	44	5	104	.....
Year	739	24	.....	.....
1931				
Jan.	16	.....	90	1
Feb.	15	.....	92	11
March	10	.....	83	12
April	14	1	69	11
May	26	.....	47	11
June	19	.....	84	11
July	12	1	75	11
Aug.	3	13	73	1
Sept.	4	.....	119	1
Oct.	8	1	112	.....
Nov.	7	.....	126	4
11 mo.	134	13	.....	.....

Labor Softening Age-Old Hostility to Mechanization

ORGANIZED labor appears to be changing its attitude on mechanization. When the depression set in, and many wage earners were put on part-time, the opinion was freely expressed by spokesmen for labor that mechanization was to blame. This view was expressed by William Green, president, American Federation of Labor, and others.

But in many instances lately evidence has been cropping out that this idea is being modified. Instead of responsibility for present difficulties being placed on mechanization, it is now being assigned to mismanagement, as indicated by the leading articles in labor publications.

"The present depression is not due to mechanization of modern production," says John P. Frey, secretary-treasurer, metal trades department, International Association of Machinists. "And it is doubtful if it is due to the so-called capitalistic system."

In his opinion, it is due to misapplication of mechanization, and "mismanagement." Automobiles, his simile is, do not cause accidents, but reckless or inexperienced drivers do.

Personals

(*Concluded from Page* 15)

ed the Continental Steel Corp. in Chicago, with Taubensee & Richards.

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L. E. Geohegan, vice president and general manager, Gulf States Steel Co., Birmingham, Ala., has been elected a director of the American Iron and Steel institute, New York.

□ □ □

William H. Woodin has been elected president of the American Car & Foundry Motors Co., succeeding C. S. Sale, resigned. The company is controlled by the American Car & Foundry Co., New York, of which Mr. Woodin also is president.

□ □ □

Robert L. Lund, vice president, Lambert Pharmacal Co., St. Louis, has succeeded John E. Edgerton as president of the National Association of Manufacturers, New York. Mr. Edgerton has been made chairman of the board.

□ □ □

Edwin G. Jones, for the past six years general superintendent of the Milwaukee sheet mills of the Inland Steel Co., Chicago, has been transferred to the general offices at Chicago for duties in the metallurgical and inspection departments. The Milwaukee mills are being shut down Jan. 1 for an indefinite period, and customers in Wisconsin will be supplied from the new continuous mills at Indiana Harbor, Ind.

Strip

Demand Holds Well in Face of Small Automotive N e e d s— Large Buyers Gain Concession

STRIP PRICES, PAGE 41

New York—Hot strip prices are easy, with 1.45c to 1.50c and 1.55c to 1.60c, Pittsburgh, being offered on wide and narrow, respectively. Cold-rolled strip at 2.05c, Pittsburgh, is being shaded $1 and $2 a ton. Demand is quiet.

Pittsburgh—Strip demand is holding fairly well. Orders are spotty and automotive business still is made up of small lots. Some business has been placed for January shipment but the outlook for a marked upturn in automotive specifications remains uncertain. Contracting is slow with recent prices of 1.50c and 1.60c usually named. Cold-rolled strip usually is 2.05c, although some larger buyers have been able to place orders at 2.00c.

Philadelphia—Prices of strip are unchanged, with producers not yet clear on first quarter. Parish Pressed Steel Co., Reading, Pa., still is asking prices on 11,000 tons of hot-rolled material for delivery over entire year. Sellers are little inclined to quote beyond first quarter, which would cover 3000 tons. This steel is for automobile chassis needs, on which the inquirer desires to bid.

Youngstown, O.—Fair volume of hot and cold-rolled strip specifications has enabled mills to maintain operations around 25 to 30 per cent. Narrow hot-rolled strip is quoted at 1.60c, Pittsburgh, and wide at 1.50c; cold-rolled is 2.05c to 2.15c, Pittsburgh and Cleveland.

Cleveland—Hot-rolled strip still is in a rather undetermined market for the first quarter, although indications point to 1.50c and 1.60c, base, applying. Some mills continue to defer announcement and attempts to name $1 up on the two sizes have met with little contract coverage. Cold-rolled on a Cleveland base is quiet at 2.05c to 2.15c.

Operations, 15-20 Per Cent; Low Over Christmas

Pittsburgh—Ingot production declined 15-20 per cent last week, although blast furnace schedules were unchanged at 10 active steelworks stacks of 54. Continued low ingot rates are expected this week. Finishing mill operations averaged lower the past week, with mills closed Friday to Sunday. During the fore part, sheet and tin plate operations held around 25 and 45 per cent, respectively; pipe and strip at 25.

Philadelphia — Ingot production was at 15-16 per cent last week, down 3½ points from the week prior. Little change is expected from this new low during this week. Three and possibly four ingot producers are expected to remain down until Jan. 1.

Operations, week of Dec. 26	**15-20**
Operations, week ended Dec. 19	**24**
Operations, week ended Dec. 12	**25.5**
Operations, this week, 1930	**36**
High for 1931 (March 19)	**57**
Low for 1931 (Dec. 26)	**15-20**

Buffalo—This week's operations in the Buffalo district are problematical. They probably will be about 35 per cent, although the lack of definite instructions as to the number of open-hearth units to be utilized were lacking late last week. Christmas week operations averaged less than 20 per cent, as shutdowns were practically complete for a 4-day holiday. In the early part of the week production ranged from 25 to 27 per cent. Steelworks executives say it is impossible to forecast operations for the first week in January but that the second holiday suspension, planned for the New Year period, may have a stimulating effect on operations when this shutdown is ended.

Cleveland—There was a complete suspension of all open-hearth activity in this district from Dec. 24 to Dec. 28. Thus the 32 per cent rate of last week was reduced to an average of 16 per cent operations for the week. Operations will be at 29 per cent as this week starts. Ten open hearths will be pouring, against 11 at the same time last week.

Chicago—Steelworks operations in the district were virtually down from Christmas eve until Sunday night, making the ingot rate 18 to 20 per cent last week. This week's output will be only a shade higher, the rate being slightly under 20 per cent. Shutdowns over the New Year holiday will be less general than over Christmas. Active steelworks blast furnaces are unchanged. Holiday ingot production in 1930 averaged 25 to 30 per cent.

Warehouse Demand Sets Low in December

New York—Reductions have been made on warehouse prices for cold-finished steel following recent mill reductions. A prominent northern New Jersey jobber reports December volume slightly ahead of November with buying well spread

Pittsburgh—December volume is off moderately from that of November. Lower prices on cold-rolled bars are looked for.

Cincinnati—Jobbers report individual orders continue exceptionally light. Prices are steady.

Chicago—December sales were far below normal, but negotiations and inquiries indicate a pick-up next month. Prices for bolts, nuts and nails show irregularity.

St. Louis—Preliminary reports indicate that December sales of steel jobbers will represent the smallest total for any month this year.

Gray Iron Castings Decline in November

Gray iron production during November showed a sharp drop from October, according to the monthly report just released by the Gray Iron Institute Inc., Cleveland.

Production dropped from an index of 47.6 in October to 37.1 in November; new business from 39.6 to 26.5 and unfilled orders from 29.7 to 23.1. One year ago production was 50.6, new business 37.1 and unfilled orders 24.1. The decline is reported from all districts. One foundry reports a good business outlook, 27 fair, 45 poor and 40 bad.

Less Cement Is Produced

Production of Portland cement in November was 8,161,000 barrels, a decrease of 26.5 per cent from last December, according to the federal bureau of mines. Shipments in November totaled 7,156,000 barrels, a decline of 18.5 per cent from a year ago. Stocks at the mills at the end of November were 22,223,000 barrels, or 3.6 per cent lower than a year ago.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago furnace	$16.50
Pittsburgh, dist. fur.	16.50 to 17.00
Pittsburgh, delivered	17.13 to 18.13
Valley furnace	15.00 to 16.00
Cleveland fur., local del.	16.00
Philadelphia, delivered	15.26 to 15.76
Virginia furnace	17.50
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.00
Buff., all-rail, Boston	19.91 to 20.41
Buff., all-rail, Brooklyn	19.15 to 19.90
Buff., all-rail, Newark	17.53 to 18.28
Ala., Bir. fur., local del.	12.00
Alabama, del. Chicago	17.01
Alabama, del. St. L.	15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	16.00 to 16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.50
Ala., Boston dock del.	16.50 to 16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.00 to 23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	17.50
Buff., all-rail, Brooklyn	19.90 to 20.40
Buffalo, all-rail Newark	18.28 to 18.78
Buff., all-rail, Boston	20.91 to 21.41
Virginia furnace	18.00
Eastern, del. Phila.	15.76 to 16.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	18.50
Eastern, del. Phila.	16.26 to 16.76

MALLEABLE

Valley furnace	16.00 to 16.50
Cleveland fur., local del.	16.00
Pittsburgh dis. fur.	16.50 to 17.00
Pittsburgh, delivered	17.13 to 18.13
Chicago, furnace	16.50
Buffalo fur., local del.	17.50
Eastern Penna., delivered	17.76 to 19.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	15.50 to 16.00
Pittsburgh, delivered	16.13 to 17.13
Eastern Penn., del.	16.00 to 16.50
Buffalo fur., local del.	16.50 to 17.00
Montreal, delivered	23.50
Valley, furnace	15.00

BESSEMER

Valley furnace	16.00 to 16.50
Pittsburgh, delivered	17.13 to 18.13
Pittsburgh, furnace	16.50 to 17.00

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	23.76 to 26.79
Copper-bear., E. Pa. fur.	21.50 to 23.00

GRAY FORGE

Valley furnace	15.50
Pittsburgh district fur.	16.00 to 16.50
Pittsburgh, delivered	16.63 to 17.63

CHARCOAL

Lake Superior, del. Chi.	20.04 to 23.04

SILVERY

Jackson County, O., fur. in per cents: 6—$19; 7—$19.50; 8—$19.00 to $21.00; 9—$20.50; 10—$21; 11—$22; 12—$23; 13—$25.

BESSEMER FERROSILICON

Jackson County, O., fur. in per cents: 10—$23; 11—$24; 12—$25; 13—$27; 14—$29; 15—$31; 16—$33.

Coke

Prices Per Net Ton

Beehive Ovens

Connellsville furnace	$2.25 to 2.35
Connellsville foundry	3.25 to 4.50
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	8.70 to 9.10
Chicago, ovens	7.50
New England, del.	10.50
St. Louis, del.	8.50
Birmingham, ovens	4.50 to 5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.00
Philadelphia, del.	8.75

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	9.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% man.	9.50 to 10.00
North African low phos.	8.00 to 9.00
Swedish basic, 65%	8.00
Swedish low phos.	9.00
Spanish, North African basic, 50 to 60%	7.00 to 8.50
Newfoundland fdy., 55%	8.00
Tungsten, spot and future short ton unit, duty paid	$11.00 to 11.25
Chrome ore, 48% net ton c.i.f.	$18.00 to 19.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 cents
South African, 52%	23 to 24 cents
South African, 49-51%	22 to 23 cents
South African, 44-47%	21.00 to 21.50
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	nominal

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Maryland, Georgia, Alabama	$40.00
Missouri	37.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	25.00 to 35.00
Georgia, Alabama	30.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

CHROME BRICK

Per Net Ton

F.o.b. shipping point	$45.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Balt. base, 9 x 4½ x 2½	45.00

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$29.00
Pittsburgh, bessemer	29.00
Youngstown	27.00
Cleveland	27.00
Philadelphia	34.30
Chicago	30.00
Forging, Chicago	35.00 to 36.00
Forging, Pittsburgh	35.00
Forging, Philadelphia	39.30

SHEET BARS

Pittsburgh	28.00
Youngstown	27.00
Cleveland	27.00
Chicago	30.00

SLABS

Pittsburgh	29.00
Youngstown	27.00
Cleveland	27.00

WIRE RODS

Pittsburgh, Cleveland	35.00 to 37.00
Chicago	36.00 to 38.00

SKELP

All grades, Pittsburgh	1.50c

Ferroalloys

For 1932 delivery

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$75.00
*Ferromanganese, del. Pittsburgh	79.79
Spiegeleisen, 19-20%, domestic fur. spot†	27.00
Ferrosilicon, 50 per cent, freight all., c. l.	77.50
Do, less carload	85.00
Do, 75 per cent	126.00 to 136.00
Silicomang., 2½% carb.	105.00
2% carbon	110.00
1% carbon	115.00
(Spot prices, $5 a ton higher.)	
Ferrochrome, 60-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Do, for spot delivery	10.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.20
Ferrovanadium, 30-40 per cent, per lb. contained, on analysis	3.05 to 3.30
Ferro-titanium carload producers' plants, net ton	140.00
Do, one-ton to c. l.	160.00
For 1932 contracts, f.o.b. freight allowed	140.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis, (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50
Ferromolybdenum, stand. 50-60 per cent, per lb.	$1.00
Cal. Molybdate, lb. cont.	.85

†Carloads. Differentials apply to quant.
*To users of carloads to 1000 tons annually. Differentials to large users.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky, Illinois mines, net ton	$13.00
Washed gravel, import duty paid tide. gross ton	13.50

Scrap

Holiday Season Cuts Melt and Shipments Are Held Back—Low Prices Limit Offerings

Chicago—While no action has been taken on some recent inquiries for iron and steel scrap to be shipped next month, the outlook appears more favorable. St. Paul, Burlington and Illinois Central railroads withdrew most of the scrap offered a week ago because of unsatisfactory prices. The former road sold only five cars out of about 5000 tons. Recent negotiations for another sale of melting steel at $8 failed to materialize.

Boston—Scrap shipments are at a low rate, limited to small lots. Foundries, in some instances, are down for the holidays. Present low prices fail to attract interest.

New York—Dullness prevails in all grades of scrap, few eastern mills taking shipments. Some No. 1 steel

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	7.50 to 8.00
Boston, dealers	4.00 to 4.50
Buffalo, No. 1	8.00 to 8.25
Buffalo, No. 2	6.25 to 6.50
Chicago	7.50 to 8.00
Cinci., deal.	7.25 to 7.75
Cleve., No. 1	7.25 to 7.75
Cleve., No. 2	7.00 to 7.50
Det., No. 1 deal.	5.75 to 6.25
Det., No. 2 deal.	4.50 to 5.00
E. Pa. del. mill	7.00 to 8.00
N. Y. deal. R. R.	5.50 to 6.00
N. Y. deal. No. 2	3.50 to 4.00
N. Y. deal. yd.	3.50 to 4.00
Pitts. No. 1	10.00 to 10.50
St. L. No. 1 sel.	7.75 to 8.25
Federal, Ill.	7.00 to 7.50
Granite City, Ill.	6.75 to 7.25
Valleys, No. 1	9.00 to 9.50

COMPRESSED SHEETS

Buffalo, dealers	6.25 to 6.50
Chi. (Factory)	6.00 to 6.50
Cleveland	7.00 to 7.25
Detroit, dealers	6.00 to 6.50
E. Pa. new mat.	7.00 to 8.00
Pittsburgh	9.75 to 10.25
Valleys	8.25 to 8.75

BUNDLED SHEETS

Buffalo	5.75 to 6.25
Cinci. deal.	6.75 to 7.25
Cleveland	6.00 to 6.50
Eastern Pa.	6.00 to 6.50
Pittsburgh	9.25 to 9.75
St. Louis	3.50 to 4.00

SHEET CLIPPINGS LOOSE

Chicago	3.75 to 4.25
Cincinnati	4.00 to 4.50
Detroit, dealers	3.75 to 4.25
St. Louis	3.50 to 4.00

STEEL RAILS SHORT

Birmingham	10.00 to 11.00
Boston, dealers	4.25 to 4.75
Buffalo	11.25 to 11.75
Chicago (3 ft.)	8.75 to 9.25
Chicago (2 ft.)	9.75 to 10.25
Cinci., deal.	12.00 to 12.50
Detroit, deal.	10.50 to 11.00
Pitts. (open-hearth, 3 ft. and less)	12.00 to 12.50
St. Louis	11.50 to 12.00

STOVE PLATE

Birmingham	7.00 to 7.50
Boston, con.	4.50 to 5.00
Buffalo	8.25 to 8.75
Chicago, net	6.25 to 6.75
Cinci., deal. net	4.50 to 5.00
Det., net deal.	4.00 to 4.50
Eastern Pa.	7.00
N. Y., deal. mill	4.75 to 5.50
St. Louis	6.50 to 7.00

COUPLERS, SPRINGS

Buffalo	11.00 to 11.50
Chicago	8.50 to 9.00
Eastern Pa.	10.50 to 11.00
Pittsburgh	10.75 to 11.25
St. Louis	8.50 to 9.00

ANGLE BARS—STEEL

Chicago	8.25 to 8.75
St. Louis	7.50 to 8.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.00 to 12.50
Cleveland bil. and bloom crops	14.00 to 14.50
Eastern Pa.	12.00 to 13.00
Pittsburgh billet bloom crops	14.00 to 14.50
Pitts., sheet bar crops	13.00 to 13.50

FROGS, SWITCHES

Chicago	7.75 to 8.00
St. Louis	8.50 to 9.00

SHOVELING STEEL

Chicago	7.50 to 8.00
Cleveland	6.25 to 6.50
St. Louis	7.00 to 7.50

RAILROAD WROUGHT

Birmingham	7.00 to 7.25
Boston, dealers	7.50 to 8.00
Buffalo, No. 1	6.25 to 6.50
Buffalo, No. 2	8.00 to 8.25
Chicago, No. 1	7.25 to 7.85
Chicago, No. 2	7.50 to 8.00
Cinci., No. 2	7.25 to 7.75
Eastern Pa.	9.50
N. Y., No. 1, deal.	7.00 to 7.50
Pitts., No. 2	10.00 to 10.50
St. Louis, No. 1	5.00 to 5.50
St. Louis, No. 2	6.75 to 7.25

SPECIFICATION PIPE

Boston	4.00 to 4.25
Eastern Pa.	9.50 to 10.00
N. Y., deal.	5.00 to 5.50

BUSHELING

Buffalo, No. 1	6.25 to 6.50
Chicago, No. 1	5.50 to 6.00
Cinn., No. 1 dl.	5.50 to 6.00
Cinn., No. 2	3.50 to 4.00
Cleve., No. 2	5.75 to 6.00
Det., No. 1 new deal.	5.00 to 5.50
St. L., No. 1	6.00 to 6.50
Val. new No. 1	8.50 to 9.00

MACHINE TURNINGS

Birmingham	3.00 to 3.50
Boston, dealers	1.30 to 1.50
Buffalo	4.75 to 5.25
Chicago	4.00 to 4.50
Cinn., deal.	3.75 to 4.25
Cleveland	4.50 to 5.00
Detroit	3.50 to 4.00
Eastern Pa.	4.50
N. Y., deal.	2.00 to 2.50
Pittsburgh	7.00 to 7.50
St. Louis	3.00 to 3.50
Valleys	6.50 to 7.00

BORINGS AND TURNINGS
For Blast Furnace Use

Boston, dealers	1.25 to 1.50
Buffalo	6.25 to 6.50
Cinn., deal.	3.75 to 4.25
Cleveland	5.25 to 5.75
Detroit, deal.	4.00 to 4.50
Eastern Pa.	3.00 to 3.50
N. Y., deal.	2.00 to 2.50
Pittsburgh	6.75 to 7.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	3.00 to 3.50
Boston, chem.	6.50 to 7.25
Boston, deal.	1.50 to 1.75
Buffalo	6.00 to 6.25
Chicago	3.50 to 4.00
Cinn., deal.	3.75 to 4.25
Cleveland	4.50 to 5.00
Detroit, deal.	4.00 to 4.50
Eastern Pa.	3.00 to 3.50
E. Pa., chem.	10.50 to 12.00
N. Y., deal.	2.00 to 2.50
Pittsburgh	6.75 to 7.00
St. Louis	5.50 to 6.00

PIPE AND FLUES

Cinn., deal.	6.00 to 6.50

RAILROAD GRATE BARS

Buffalo	6.25 to 6.50
Chicago, net	5.75 to 6.25
Cincinnati	5.50 to 6.00
Eastern Pa.	7.00
N. Y., deal.	5.00 to 5.50
St. Louis	6.00 to 6.50

FORGE FLASHINGS

Boston, deal.	5.00 to 5.25
Buffalo	6.25 to 6.50
Cleve. ov. 10 in.	7.00 to 7.50
Detroit	5.00 to 5.50

FORGE SCRAP

Boston, del.	2.00 to 2.25
Chicago	10.50 to 11.00
Eastern Pa., del.	6.75

ARCH BARS, TRANSOMS

Chicago, net	8.50 to 9.00
St. Louis	6.50 to 7.00

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	7.00 to 7.50
Chi., steelworks	6.00 to 6.50
Cleveland	6.75 to 7.00
Eastern Pa. del.	7.00 to 8.00
Pittsburgh	9.25 to 9.75
St. Louis	6.50 to 7.00

STEEL CAR AXLES

Birmingham	11.50 to 12.00
Boston, ship. pt.	11.00 to 12.00
Buffalo	12.00 to 12.50
Chicago	12.25 to 12.90
Eastern Pa.	15.50 to 16.00
St. Louis	11.50 to 12.00

SHAFTING

Bos., ship. pt.	10.00 to 10.50
Chicago	7.85 to 8.40
N. Y., deal.	9.00 to 9.50
St. Louis	9.00 to 9.50
E. Penna.	15.00 to 15.50

CAR WHEELS

Birming. iron	8.00 to 9.00
Boston, iron	12.50 to 13.50
Buffalo, iron	10.00 to 10.50
Buffalo, steel	10.50 to 11.00
Chicago, iron	8.50 to 9.00
Chi. rolled steel	8.75 to 9.25
Cincinnati, iron	9.50 to 10.00
E. Pa. steel	10.00 to 10.50
E. Pa. iron	11.00 to 11.50
Pitts. iron	10.00 to 10.50
Pitts., steel	10.75 to 11.25
St. Louis, iron	7.00 to 7.50
St. Louis, steel	7.50 to 8.00

NO. 1 CAST SCRAP

Birmingham	8.50 to 9.00
Buffalo (Mach.)	9.50 to 10.00
Boston, textile	7.00 to 8.50
Chicago, mach.	8.90 to 9.50
Chi., railroad	8.10 to 8.70
Chicago, agri.	7.50 to 8.10
Cinn., mach. cup., gross	11.00 to 11.50
Cleve. cupola	10.00 to 10.50
Det., net deal.	8.00 to 8.50
E. Pa. cupola	11.50
N. Y. cup. deal.	7.00 to 7.50
N. Y., del. local foundries	12.00
Pitts., cupola	10.00 to 10.50
San Fran., del.	13.50 to 14.00
Seattle	5.00 to 7.50
St. L. No. 1 ma.	8.50 to 9.00
St. L., No. 1	7.50 to 8.00

HEAVY CAST

Boston	6.00 to 6.50
Bost. mach. cast	8.00 to 9.00
Buffalo, break	6.25 to 6.50
Cleve., break	6.00 to 6.50
Detroit, auto, net deal.	10.00 to 10.50
Det., break., dl.	4.75 to 5.25
Eastern Pa.	9.00 to 9.50
N. Y. break, dl.	5.75 to 6.00
N. Y. No. 1 dl.	7.00 to 7.50
Pittsburgh	8.00 to 8.75

MALLEABLE

Boston R. R.	11.50 to 12.00
Buffalo	9.75 to 10.25
Chicago, agri.	7.00 to 7.50
Chicago, R. R.	7.00 to 7.50
Cinci., R. R. del.	9.25 to 9.75
Cinci., agri. del.	9.00 to 9.50
Cleveland, rail	10.00 to 10.50
Det. auto deal.	9.00 to 9.50
St. Louis, rail	6.00 to 6.50

RAILS FOR ROLLING
5 feet and over

Birmingham	10.00 to 10.50
Boston, deal.	6.00 to 7.00
Buffalo	9.50 to 10.00
Chicago	10.00 to 10.50
Eastern Pa.	11.50 to 12.00
New York	6.25 to 6.75
St. Louis	9.50 to 10.00

LOCOMOTIVE TIRES

Chicago, cut	10.00 to 10.50
St. L., No. 1	9.00 to 9.50

LOW PHOS. PUNCHINGS

Chicago	10.00 to 10.50
Buffalo	11.50 to 12.00
Eastern Pa.	13.00
Pittsburgh	11.00 to 11.50

is moving to Coatesville, Pa., at $7.50, delivered, or $4.85, Jersey points, where most of the material originates.

Philadelphia—A decline in the price of No. 1 heavy melting steel to a level of $7 to $8, delivered is due to a drop of 25 cents by Bethlehem Steel Co. on a relatively small tonnage, placed for that point and Sparrows Point, Md.

Buffalo—Bethlehem Steel Co. has placed an additional 800 tons of heavy melting steel for delivery to Lackawanna, N. Y., making 2800 tons in all.

Pittsburgh—Practically all scrap consumers have suspended shipments and new business is lacking. Prices receive little test and are largely nominal. Some forced liquidation is developing occasional low prices although dealers are able to pick up little heavy melting steel below $10.

Cleveland — Expecting the low point in iron and steel scrap activities to be reached last week, the trade was not disappointed although the subsidence has not been more than seasonal. Scrap lists from Detroit, covering largely compressed sheets, borings and turnings, are much lighter than usual.

Cincinnati—Lack of buying interest in scrap was accentuated by the holidays, with recent restrictions on shipments still in force. Although trading in small lots provides no test dealers have reduced offering prices on heavy melting steel, turnings, borings and busheling 50 cents.

St. Louis—Typical holiday conditions obtain in the steel and iron scrap market. New business consisted of a few scattering cars for prompt shipment, with prices at the lowest point of the year.

Birmingham, Ala.—No steel and iron scrap business worthy of mention has been placed for January delivery.

Coke Shipments Are Retarded for Holidays

Coke Prices, Page 48

Pittsburgh—The decline in foundry operations over the year-end has resulted in reduced shipments of beehive foundry coke, but sellers have some orders for January shipment. The market continues $3.25 to $4.50. No new blast furnace business is in prospect. Spot furnace coke is $2.25 to $2.35.

Boston—Most users of by-product foundry coke are covered for first half. Current demand is light.

New York—Beehive furnace coke continues $2 to $2.25, Connellsville, Pa., with specifications reflecting seasonal dullness. Beehive foundry coke is $3.25 to $3.50, Connellsville, for standard grades; $4.50, Latrobe, Pa., for premium brands.

Cincinnati — Specifications for foundry coke have yielded to holiday influence. Demand for domestic grades is fairly well sustained.

St. Louis—Consumers have not yet covered for first quarter, current orders being limited to small, prompt lots. Shipments have dropped to the low point of the year.

Pig Iron

Larger Demand Expected in January — Shipments Aided By Impending Freight Rise

PIG IRON PRICES, PAGE 48

Pittsburgh—Orders and inquiries for pig iron are almost entirely lacking. Consumption has declined to a low level for the holiday period. Prices are partly nominal, continuing $15.50 to $16, valley, for No. 2 foundry; $16 to $16.50 for bessemer and malleable; and $15 for basic.

Boston—Little inquiry is noted for first quarter, although business is expected to improve early in 1932. It is reported that a considerable part of the 5000 tons of Dutch iron destined for Providence, R. I., will be stored.

New York—Sales are light and inquiry is noted for 500 tons for first quarter. Buffalo iron is unchanged at $14.25 to $15, furnace, with eastern Pennsylvania iron at approximately the same spread. Despite reports of weakness, southern iron is unchanged at $11, furnace, or $16.50, delivered New York docks.

Philadelphia — More interest is noted in basic, though sales are lacking and prices are nominal. An order for 1000 tons of malleable is expected to be closed soon. Foundry demand is light, with $15, base, eastern Pennsylvania furnace, the more general price.

Youngstown, O.—Competition has become keener. Small lots of malleable, foundry and bessemer continue to be bought, but less frequently than a month ago. Bessemer and malleable are quoted at $16 to $16.50, valley; No. 2 foundry, $15.50 to $16; basic, $15; and gray forge and No. 3 foundry, $15.50.

Cleveland—Shipments have been stimulated moderately by the desire of melters to obtain iron before freight rates are increased early in January. December shipments, consequently, are likely to be close to the volume in November. The outlook for January is more promising, as requirements for motorcar manufacture are expanding. Currently, the market is quiet, sales by furnace interests with headquarters in Cleveland having shrunk to about 3000 tons in the past week. Prices are steady.

Cincinnati—Inquiries for pig iron total about 2000 tons. Sales are small. Southern iron continues $11, base, Birmingham.

Chicago — The $16.50, Chicago furnace, base is nominal because of light sales. An increase in automotive shipments to western Michigan plants is scheduled for next month. Moderate gains in the jobbing foundry melt also are expected.

St. Louis—The market continues quiet, and though competition is keen quotations are unchanged. A number of melters will have considerable stock on hand after the first of the new year.

Birmingham, Ala.—Few orders have been received for delivery in January. The price is weak, but $12, base, still is being quoted for local delivery. Production is down to four furnaces, two stacks being prepared for operation next month.

Toronto, Ont.—The year is closing with pig iron prices in the Canadian market at the same level as at the beginning, but business is lighter, sales being restricted to occasional carloads. The total for the week was less than 300 tons.

Ferroalloy Sales Are Slightly More Active

Ferroalloy Prices, Page 48

New York—Ferromanganese specifications are coming in slowly. Ferromanganese for next year is $75, duty paid. Domestic spiegeleisen, 19 to 21 per cent, is $27, furnace. Silicon zirconium, 35 to 40 per cent zirconium, has been reduced from 18.00c a pound of alloy in 100-pound lots and more to 16.00c. Smaller lots now are 19.00c, against 21.00c previously.

Pittsburgh — First quarter contracting for ferroalloys is slightly more active. Specifications on old contracts continue slow.

Pacific Coast

Prospective Demand Gives Hope for Better Movement in 1932—Pipe Requirements Bring Some Inquiry — Bars, Plates and Shapes Slow—Warehouses Able to Fill Most Current Steel Needs

Seattle—Business sentiment in the Pacific Northwest is hopeful, based more on expectations than on definite awards, but considerable work is to be up for action early in 1932. Any change for the better that will release funds will result in bringing many important projects to a head.

Bars, Plates and Shapes

There is less demand for bars, both merchant and reinforcing, than at any time this year. Unless demand improves, local steel mills will not reopen after the holidays. Only 300 tons of reinforcing is involved in three projects pending, the Port Angeles postoffice and two federal reclamation jobs. Pacific Coast Steel Corp., Seattle, booked 25 tons for the Pasco postoffice.

Local fabricating plants have taken on no new work of any size but are interested in two jobs involving nearly 4000 tons. These include the Portland postoffice, 2000 tons, and 1800 tons for the University bridge approaches, Seattle, plans for which will be out early next month, after long delay. Other projects are developing slowly. Isaacson Iron Works, Seattle, is furnishing 14 tons for the Pasco, Wash., postoffice.

Finished Materials

A few unexpected small orders have given wholesale jobbers hope that stocks are to be replenished soon. These are mostly for structurals and plates, 10 gage and heavier, for repair and replacement work. It is evident that stocks are almost exhausted and dealers must soon buy in greater volume. Sheets are lagging, however, although local houses have had some recent orders for corrugated sheets. There is practically no mill buying, warehouses being able to supply the present demand out of stock. In Seattle territory, the jobbing price of copper sheets was advanced ½-cent Dec. 19 in line with a mill increase. Seattle wholesale houses report prime minimums are being well maintained and prices are better stabilized than in the Portland district, where slashing and lack of co-ordination have served to create conditions less favorable than here.

Pipe Inquiry Improves

More than 1000 tons of cast iron awards are pending including 636 tons for Kalispell, Mont., and 350 tons for Waldport, Oreg. Pasco, Wash., will receive bids Dec. 28 for 150 tons. Everett, Wash., has returned tenders for furnishing 100 tons of 6-inch water main and next month will probably readvertise for 8-inch pipe. Additional specifications are expected soon. Awards last week totaled 100 tons, Port Townsend purchasing 50 tons from United States Pipe & Foundry Co., Burlington, N. J., and Pacific States Cast Iron Pipe Co., Provo, Utah, taking 50 tons of 8-inch for Waitsburg, Wash.

Britain Seeks Basis for Tariff; Trade Dull

London—(*By Cable*)—Approach of the Christmas holidays, with the usual recession, adds its influence to the dullness of trade and all markets are sluggish. Returns of production and exports in November give some encouragement. No change in pig iron and steel prices is expected in the near future. Galvanized sheets are firmer and tin plate shows a livelier condition.

A representative of the board of trade is touring British works to report to the government on tariffs for discussion in February, as a basis for new duties.

Brussels reports a slight quickening in trade with the Far East. Berlin finds exports of German works are restricted, owing to low world prices. Domestic prices will be reduced to increase consumption at home. Paris finds conditions in the French market are growing worse. Negotiations are active toward formation of an international export syndicate.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 24

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON	£ s d		£ s d	£ s d
Foundry, 2.50-3.00 Silicon	$10.03	2 18 6	$10.45 to $11.18	2 3 0 to 2 6 0
Basic bessemer	9.60	2 16 0*	9.72 to 10.21	2 0 0 to 2 2 0
Hematite, Phos. .03-.05	11.15	3 5 0	.....	.....
SEMIFINISHED STEEL				
Billets	$18.44	5 7 6	$11.91 to $12.15	2 9 0 to 2 10 0
Wire rods, No. 5 gage	29.16	8 10 0	24.30 to 25.52	5 0 0 to 5 5 0
FINISHED STEEL				
Standard rails	$28.30	8 5 0	$28.55	5 17 6
Merchant bars	1.07c	7 0 0	.59c to .61c	2 14 0 to 2 15 0
Structural shapes	1.19c	7 15 0	.58c to .59c	2 13 0 to 2 14 0
Plates, †¼ in. or 5mm	1.26c	8 5 0	.74c to .75c	3 7 0 to 3 8 0
Sheets, black, 24 gage or 0.5 mm.	1.34c	8 15 0	1.51c to 1.54c	6 17 6 to 7 0 0
Sheets, gal., 24 gage, corr.	1.42c	9 5 0	1.54c	7 0 0
Bands and strips	1.45c	9 10 0	.77c to .80c	3 10 0 to 3 12 6
Plain wire, base	1.30c	8 10 0	1.18c	5 7 6
Galvanized wire, base	1.68c	11 0 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	1.68c	11 0 0	1.21c	5 10 0
Tin plate, box 108 lbs.	$ 2.44	0 14 3	$3.20	0 13 2‡

British ferromanganese $80 to $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

			French Francs		Belgian Francs		Renten Marks
	£ s d						
Fdy. pig iron, Si. 2.5	$10.03	2 18 6	$9.85	250(2)	$11.16	400	$18.56 78
Basic bessemer pig iron	9.60	2 16 0*	....	....	10.04	360	20.35 85.50
Furnace coke	2.14	0 12 6	5.71	145	4.46	160	5.09 21.40
Billets	18.44	5 7 6	15.37	390	14.09	505	26.30 110.50
Standard rails	1.26c	8 5 0	1.41c	785	1.57c	1,210	1.37c 127
Merchant bars	1.07c	7 0 0	.90c	500	.69c	530	1.38c 128
Structural shapes	1.34c	8 15 0	.99c	550	.69c	530	1.35c 125
Plates, †¼-in. or 5mm	1.38c	9 0 0	1.17c	650	.83c	640	1.67c 154.50
Sheets, black, 24 ga. or 0.5mm.	1.34c	8 15 0	1.77c	985	1.69c	1,300	2.75c 255
Sheets, galv., corr., 24 ga. or 0.5mm	1.42c	9 5 0	2.39c	1,325	1.95c	1,500	4.43c 410
Plain wire	1.30c	8 10 0	1.68c	935	1.95c	1,500	2.24c 207
Bands and strips	1.45c	9 10 0	1.04c	575	.92c	710	1.60c 148

*Basic. †British ship-plates, Continental bridge plates. ‡German.
British quotations are for basic open-hearth steel, Continental usually for basic-bessemer steel.

Machinery

CONTEMPLATION of these final machinery market reports for 1931 leaves an impression that an unsatisfactory old year is closing not without leaving some hope for the new year. Unquestionably, a heavy backlog of business is accumulating. Realization of necessity for logical replacement plans rapidly is developing. Obsolescence is accelerated by radical improvements in design. At least, the stage is set for the curtain of gloom to rise.

New York—A year of discouragingly light volume in machine tool sales draws to a close with unpleasant dullness still beclouding the business horizon. While scattering inquiries are being carried over into 1932, the number of these inquiries which can be classed as active is decidedly small.

It is certain that 1931 will go down in history as one of painful leanness for most builders of and dealers in industrial equipment. There have been, and still are, a few cases of activity generated by orders from the automotive industry and from government departments.

Additional government lists are closing on Jan. 5 and 12. It is noticeable that more dealers and builders are bidding for this government business than ever before. It is reported that some exceedingly low prices are being offered, one or two bidders in a group cutting far below the general price level of the group as a whole.

Export business is at a low ebb, and Russia, which in the early part of 1931 was a big market for American machine tools, as yet shows few signs of reviving this market. Exports to other countries also have become few and far between and the immediate outlook is not bright.

Pittsburgh—The machinery market shows little activity, a combination of seasonal influences and generally depressed industrial activity having a doubly restricting effect upon volume of orders and inquiry. A hopeful sign is that December business for some interests shows a slight improvement over the disconcerting quietness prevailing during November. Most of the recent orders have grown out of inquiries which have been pending for several months. Such purchases usually call only for that machine tool equipment which is most urgently needed.

Cleveland—Automotive activity in this district—mainly in manufacture of parts—is enlivening the machinery market to some extent, enough at least to make the outlook for the early part of 1932 a little more encouraging than it otherwise would be. Most of the business which has resulted thus far has been for machine tool repair parts and small tools.

A manufacturer of electric refrigerators in a nearby city recently announced a heavy production schedule on a low-priced unit.

Preliminary announcements prove that a number of new or greatly improved machine tools will appear in the market after the first of the year and that they will be pushed by revised selling plans.

Chicago—Machine tool prospects for next month now appear a shade brighter. This is due chiefly to a few preliminary plans for small scale industrial building operations and to scheduled replacement of outworn equipment by certain other concerns. Most of this prospective work involves light manufacturing operations.

A one-story manufacturing building, sold by Continental Can Co. to Wizard Inc., 1444 West Thirty-seventh street, Chicago, is being remodeled for the purchaser at a cost of $140,000, with equipment. This is located in the Clearing industrial district.

Used tool inquiry is fair and more trade-in proposals are being offered. Sales in the week just closed were negligible, as many concerns have closed down until early in January.

Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 7.25c, Conn., for copper

Sheets	
Yellow brass (high)	13.25
Copper, hot rolled	16.37½
Lead sheets, to jobbers	7.00
Zinc sheet (100-lb. base)	9.00
Tubes and Pipes	
Seamless yellow brass (high)	16.50
Seamless copper	15.87½
Rods	
Yellow brass (high, full turnings)	11.00
Naval brass	12.12½
Anodes	
Copper untrimmed	13.87½
Wire	
Yellow brass (high)	13.25

Old Metals

Dealers' buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.25 to 4.50
Chicago	3.75 to 4.25
Cleveland	4.00 to 4.50
St. Louis	3.50
Heavy Yellow Brass	
New York	2.75 to 3.00
Heavy Copper and Wire	
New York	5.25 to 5.50
Boston	5.00 to 5.25
Chicago	4.00 to 4.50
Cleveland	3.75 to 4.25
St. Louis	3.75
Composition Brass Borings	
New York	4.00 to 4.25
Yellow Brass Tubing	
Cleveland	2.75 to 3.25
Light Copper	
New York	4.25 to 4.50
Chicago	3.75 to 4.25
Cleveland	3.75 to 4.00
St. Louis	3.50
Light Brass	
Boston	1.75 to 2.00
Chicago	2.25 to 2.75
Cleveland	1.75 to 2.25
St. Louis	2.00
Zinc	
New York	1.00 to 1.25
Cleveland	1.00 to 1.25
St. Louis	1.50
Aluminum	
Clippings, new, soft, Cleve.	11.00 to 11.50
Clippings, hard, Cleveland	7.50 to 8.50
Borings, Cleveland	3.00 to 3.25
Mixed cast, Cleveland	3.75 to 4.25
Mixed cast, Boston	3.25 to 3.50
Mixed cast, St. Louis	3.50 to 4.00

Secondary Metals

Remelt aluminum No. 12'	8.50 to 9.50
Brass ingots, 85-5-5-5	7.12½

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
December 19	7.25	7.37½	7.00	21.62½	22.05	3.75	3.55	3.15	22.90	6.25	35.00
December 21	7.25	7.37½	7.00	21.80	22.30	3.75	3.55	3.15	22.90	6.25	35.00
December 22	7.25	7.37½	7.00	22.00	22.55	3.75	3.55	3.15	22.90	6.25	35.00
December 23	7.25	7.37½	7.00	22.00	22.55	3.75	3.55	3.15	22.90	6.25	35.00

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New York

NEW YORK—United Metal Goods Mfg. Co. has been incorporated with 100 shares common stock by H. Gittelson, 26 Court street, Brooklyn, N. Y.

NEW YORK—Layered Wire Machine Corp. has been incorporated with 100 shares common stock to manufacture machinery, by E. Scotti, 36 West Forty-fourth street, New York.

NEW YORK—American Self-Selector Corp. has been incorporated with $20,000 capital in preferred shares and 10 shares common stock to manufacture mechanical devices, by S. Stone, 401 Broadway, New York.

New Jersey

NEWARK—Shur-Lift Mfg. Co. has been incorporated with 2500 shares common stock to manufacture machinery and tools, by John H. Tuers, 11 Raymond boulevard, Newark, N. J.

Michigan

DETROIT—Michigan Alloys & Metal Co. has been incorporated with $4000 capital to deal in metals, by Jacob Kovinsky, 909 Peoples State Bank building, Pontiac, Mich., and associates.

FLINT—Flint Scrap Iron & Metal Co., 806 West Second street, has been incorporated with $50,000 capital to deal in and prepare ferrous and nonferrous metals, by Louis S. Lebster, 2112 Miller road, Flint, Mich.

GRAND RAPIDS—Flottorp Propeller Corp. will build an airplane propeller manufacturing plant at the airport at Grand Rapids.

PLYMOUTH—Bieszk Bros. Co. has been incorporated with $50,000 capital to operate a machine shop, by Albert G. Bieszk, 37705 Plymouth road, Plymouth, Mich.

Southern States

NEW ORLEANS, LA.—U. S. Oil Refining Co., station F, box 36, has been organized by E. L. Chapman to take over the plant formerly owned by Southport Refining & Export Co. at Southport, La. Cracking still units will be installed later.

WILMINGTON, DEL.—Gas Lift Engineering Corp. has been incorporated with $50,000 capital to manufacture supplies for oil, gas and water wells, by Corporation Service Co., Wilmington, Del.

Missouri

ST. LOUIS—Krauz Automotive Body Co., 3032 Gravois street, is building an addition, 55 x 125 feet, to include repair facilities for motor trucks.

ST. LOUIS—Metalcraft Corp. 5101 Penrose avenue, has leased a building at 4204 North Union boulevard for use as a warehouse and repair department.

Oklahoma

DRUMBRIGHT—Stanolind Pipe Line Co., Philcade building, Tulsa, Okla., will build a pumping station, 66 x 78 feet, here. It is understood electrically operated centrifugal pumps will be installed. C. M. Scott Jr. is chief engineer.

EL RENO—Bureau of federal prisons, Washington, is having plans made for a waterworks system for the federal reformatory under construction here. Hawk & Parr, Hales building, are architects.

Texas

AUSTIN—Austin Airport Corp. will build a hangar at the municipal airport. Plans are being drawn by Joseph Wehner, Austin.

DALLAS—Dallas Boiler & Tank Co. has been incorporated with $10,000 capital by Henry L. Hinckley, 3214 Hickory street.

WICHITA FALLS—General Machine & Supply Co. has been incorporated with $5000 capital, by R. D. Noland, 2301 Princeton street, Wichita Falls, Tex.

Wisconsin

SUPERIOR—Great Lakes Coal & Dock Co., Allouez Bay, Wis., will build a 200-foot coal dock, to cost $140,000.

Minnesota

DULUTH—Duluth Ornamental Iron & Steel Co. Inc. has been incorporated with $50,000 capital to manufacture ironwork, by Cosmo A. Rich, Peter A. Rich and Alfred Youngren.

DULUTH—City council, C. D. Jeronimus city clerk, has approved plans for an addition and alterations to the Lakewood pumping station, including new boilers, pumps and other equipment, to cost $150,000.

ST. LOUIS PARK—City voted at election Dec. 8 to build water tank and artesian water supply system to cost $30,000. Alexander & Bradley, 410 New York building, Minneapolis, are engineers.

ST. PAUL—Minnesota Fence & Wire Works, 240 University avenue, is having plans made for an addition to its plant. Max Buetow, 1380 Blair street, is architect.

Iowa

CEDAR RAPIDS—Century Engineering Corp., 213 Seventeenth avenue, is building a 3-story plant, 60 x 140 feet.

DES MOINES—Boeing Air Transport Inc., 230 Park avenue, New York, plans to build an air depot at the municipal airport, to cost $40,000.

DES MOINES—Haight Tractor & Equipment Co., 1314 Walnut street, recently incorporated, is in the market for a bench grinder, large drill press, small lathe, motors, welding equipment, large vise and anvil and a 30-ton press.

DUBUQUE—City council is considering plans for a coal and ore dock to cost $175,000. John Stuber is city clerk.

MASON CITY—Jacob Decker & Sons Packing Co. has awarded contracts for a power house addition for which power equipment will be required. Cost is estimated at $375,000. Ralph D. Thomas, 1200 Second avenue south, Minneapolis, is engineer.

SIOUX CITY—Western States Mfg. Co. will build a 1-story plant at West Seventh and Omaha streets, 50 x 100 feet, to cost $35,000.

SIOUX CITY—Sioux City Gas & Electric Co., 517 Fifth street, is building a turbine house at the Big Sioux power plant in North Riverside, to cost $50,000.

VILLISCA—At a special election Dec. 7 the city voted to build a municipal power and light plant costing $150,000. Edward S. Jenkins is city clerk.

WATERLOO—Waterloo Foundry Co., 1049 Sheffield avenue, manufacturer of sash weights and other castings, is building a 1-story foundry addition.

Pacific Coast

HOQUIAM, WASH.—Lamb Tractor Co. has been organized by Frank H. Lamb and associates, of the Lamb-Grays Harbor Co., which operates a machine shop, to manufacture tractors designed especially for logging operations, at the rate of one tractor a week. Capital is $400,000.

LOS ANGELES—Booth Engineering Co. Ltd., 3117 San Fernando road, advises it is increasing by about 15,000 feet its space for production of bakery equipment, refrigeration equipment, ice packaging and vending machines. (Noted Nov. 30.)

SEATTLE—Chambers Electric Brake Co. has been incorporated with $50,000 capital stock by M. B. Chambers, 1308 Northern Life building, and associates.

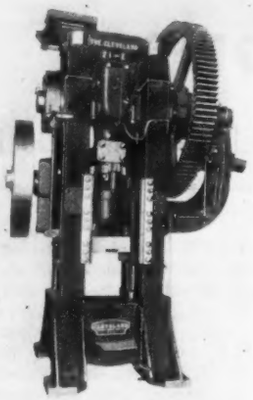
Dominion of Canada

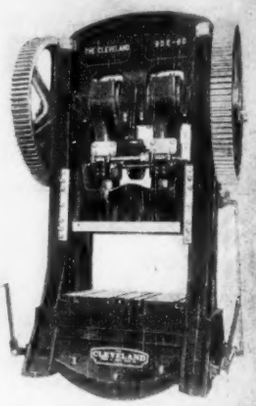
BURLINGTON, ONT.—Niagara Brand Spray Co. Ltd., manufacturer of fruit-spraying equipment, will build a plant here to cost $50,000.

COBOURG, ONT.—Iver Johnson Arms & Cycle Works of Canada Ltd. is installing equipment for manufacturing purposes in the building formerly occupied by the H. W. Cooey Machine & Arms Co.

SARNIA, ONT.—Baker-Perkins Co., Saginaw, Mich., has leased temporary quarters for the manufacture of baking and confectionery-making machinery pending erection of a permanent plant on a site recently purchased.

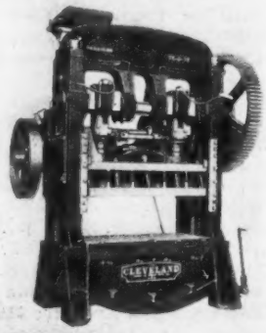
CLEVELAND

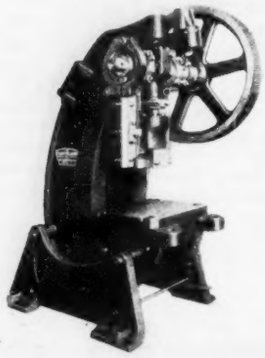


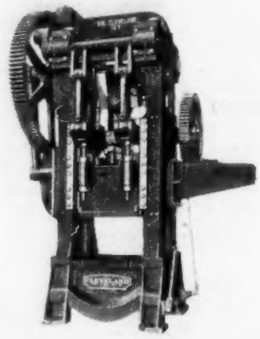


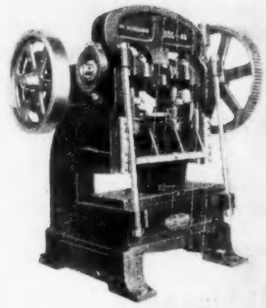
WHILE the illustrations on this page show but a few of the many types of Cleveland Presses, they will convey some idea of our ability to meet your requirements whether they call for a single Inclinable or a battery of Double Crank Toggles.

Besides, each of these types can be furnished in a great many sizes and the distance between uprights, die space and stroke can be varied to suit particular requirements. We shall be pleased to submit complete specifications and illustrations covering any type of press you may be interested in.





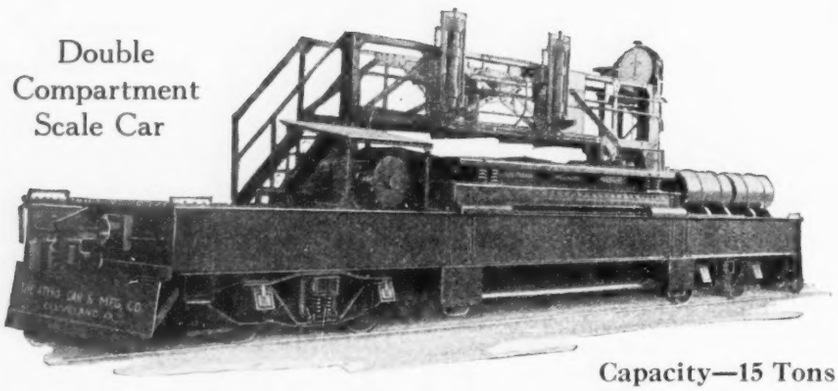




THE CLEVELAND PUNCH & SHEAR WORKS CO.
CLEVELAND OHIO, U.S.A.

ATLAS CARS

Double Compartment Scale Car



Capacity—15 Tons

On many of the larger furnaces double compartment scale cars are found highly profitable. These cars permit the picking up of two skip loads at one trip, thereby saving time especially in regard to spotting the car.

ATLAS Double Compartment Cars have air operated cylinders for controlling bin gates, and are equipped with ATLAS Indicating and recording mechanism.

Two of these cars are in use at the new furnace of the Inland Steel Company, Indiana Harbor, Ind.

The ATLAS Car & Mfg. Co.

Engineers Cleveland, Ohio *Manufacturers*

ATLAS Products

Storage Battery Locomotives—Electrically operated Industrial Cars—Scale Cars and Weighing Cars of all kinds—All kinds of Industrial Cars — Ore Transfer Cars and Blast Furnace Charging Cars — Pushers, Charging Cars, Door Handling Machines, and Coke Quenching Cars for By-Product Coke Ovens. Atlas Patented Indicating and Recording Mechanism for Weighing Scales.

WHERE-TO-BUY

A classified list of advertisers according to products. ¶Index to advertisements gives page number of any advertiser.

ABRASIVES (Polishing)
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh, Pa.

ACETYLENE
Linde Air Products Co., 30 E. 42nd St., New York City.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS—See FERROALLOYS

ALUMINUM (Tubing)
Summerill Tubing Co., Bridgeport, Montgomery Co., Pa.

ANGLES, CHANNELS—See STEEL (Structural)

ANNEALING BOXES
Smith, George H., Steel Casting Co., Milwaukee, Wis.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh, Pa.

ANVILS (Cast Steel)
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

APPRAISALS
Brassert, H. A., & Co., 310 S. Michigan Ave., Chicago, Ill.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

ARBORS
Morse Twist Drill & Machine Co., New Bedford, Mass.

ARCHITECTS (Industrial)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

BALING PRESSES
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.

BANDS AND HOOPS (Galvanized Strips)
Sharon Steel Hoop Co., Sharon, Pa.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.

BARS (Concrete Reinforcing)
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
McClintic-Marshall Corp., Bethlehem, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Scully Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.
Phoenix Iron Co., The, 20 So. 15th St., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.

BEARINGS (Journal)
Bantam Ball Bearing Co., The, South Bend, Ind.
Hyatt Roller Bearing Co., Harrison, N. J.
Timken Roller Bearing Co., The, Canton, O.
Tyson Roller Bearing Corp., Massillon, Ohio.

BEARINGS (Motor)
Hyatt Roller Bearing Co., Harrison, N. J.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Hyatt Roller Bearing Co., Harrison, N. J.
Tyson Roller Bearing Corp., Massillon, Ohio.

BEARINGS (Thrust)
Bantam Ball Bearing Co., The, South Bend, Ind.
Timken Roller Bearing Co., The, Canton, O.
Tyson Roller Bearing Corp., The, Massillon, Ohio.

BEARINGS AND BUSHINGS (Brass and Bronze)
Buffalo Bronze Die Cast Corp., 100 Arthur St., Buffalo, N. Y.
Erie Bronze Co., 402 W. 19th St., Erie, Pa.
Murray Copper & Bronze Co., 4635 Butler St., Pittsburgh, Pa.

BENDING AND STRAIGHTENING MACHINES
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Hinman, D. A., & Co., Sandwich, Ill.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

BILLETS (Alloy and Carbon Steel)
Republic Steel Corp., Youngstown, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

BILLETS AND BLOOMS
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co., 208 South LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.

BLAST FURNACE SPECIALTIES
Brosius, Edgar E., Inc., Sharpsburg P. O., Pittsburgh, Pa.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOWERS
General Electric Co., Schenectady, N. Y.

BOARDS (Hammer)—See HAMMER BOARDS (Drop)

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.
Lukenweld, Inc., Coatesville, Pa.

BOILER SETTING & CHIMNEYS
Rust Engineering Co., 2600 Koppers Bldg., Pittsburgh

BOILER TUBES—See TUBES (Boiler)

BOLT AND NUT MACHINERY
Landis Machine Co., Waynesboro, Pa.

BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Oliver Iron & Steel Corp., S. 10th and Muriel Sts., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Sons, Inc., 16th & Rockwell Sts., Chicago, Ill.

BORING MILLS (Horizontal)
Landis Tool Co., Waynesboro, Pa.

BOXES (Carbonizing)
Driver-Harris Co., Harrison, N. J.

BOXES (Open Hearth Charging)
Lukenweld, Inc., Coatesville, Pa.

BRAKES (Electric)
Cutler-Hammer, Inc., 1265 St. Paul Ave., Milwaukee, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.

BRICK (Chrome)
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

BRICK (Fire Clay)
Climax Fire Brick Co., Climax, Pa.
Eureka Fire Brick Works, First National Bank Bldg., Pittsburgh, Pa.
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Haws Refractories Co., Johnstown Savings Bank Bldg., Johnstown, Pa.

BRICK (Insulating)—See INSULATING BRICK

BRICK (Magnesite)
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

WHERE-TO-BUY

BRICK (Silica)
Carborundum Co., The, Perth Amboy, N. J.
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Hawa Refractories Co., Johnstown Savings Bank Bldg., Johnstown, Pa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Norton Co., Worcester, Mass.

BRIDGE CRANES (Ore and Coal Handling)
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Belmont Iron Works, 22nd & Washington Ave., Philadelphia, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.
Morgan Engineering Co., Alliance, O.
Phoenix Bridge Co., 20 S. 15th St., Philadelphia, Pa.
Truscon Steel Co., Youngstown, O.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Blaw-Knox Co., 2002 Farmers Bank Bldg., Pittsburgh.
Brosius, Edgar E., Inc., Sharpsburg P. O., Pittsburgh, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUCKETS (Dumping)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.

BUCKETS (Elevator)
Hendrick Mfg. Co., 48 Dundaff St., Carbondale, Pa.

BUILDINGS (Industrial)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.
Blaw-Knox Co., 2002 Farmers Bank Bldg., Pittsburgh, Pa.

BUILDINGS (Steel)—See BRIDGES, ETC.)

BULLDOZERS
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.

BURNERS (Acetylene)—See TORCHES & BURNERS

BURNERS (Automatic)
American Heat Economy Bureau, Inc., Wabash Bldg., Pittsburgh, Pa.

BURNERS (Fuel, Oil, Gas, Combination)
Surface Combustion Co., 2375 Dorr St., Toledo, O.

BUSINESS CARDS (Engraved)
Wiggins, John B., Co., The, Fullerton & Racine Aves., Chicago, Ill.

BY-PRODUCT PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh, Pa.

CAN MACHINERY
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.

CAP SCREWS—See SCREWS (Cap, Set, Safety)

CARBIDE
Linde Air Products Co., 30 E. 42nd St., New York City.

CAR DUMPERS
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CAR PULLERS & SPOTTERS
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.) (Sprague Hoist Div.)

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Bethlehem Steel Co., Bethlehem, Pa
Easton Car & Const. Co., 10 E. 40th St., New York.

CARS (Ingot and Open Hearth Charging)
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Easton Car & Const., Co., 10 E. 40th St., New York.
Lukenweld, Inc., Coatesville, Pa.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
International Nickel Co., 67 Wall St., New York City.
Murray Copper & Bronze Co., 4635 Butler St., Pittsburgh, Pa.
National Alloy Steel Co., Blawnox, Pa.

CASTINGS (Alloy Steel)
Alloy Cast Steel Co., The, Marion, Ohio.
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Damascus Steel Casting Co., New Brighton, Pa.
Treadwell Engineering Co. Easton, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bronze Die Cast Corp., 100 Arthur St., Buffalo, N. Y.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Erie Bronze Co., 402 W. 19th St., Erie, Pa.
Murray Copper & Bronze Co., 4635 Butler St., Pittsburgh, Pa.

CASTINGS (Die)—See DIE CASTINGS

CASTINGS (Electric Steel)
Maynard Electric Steel Casting Co., 2858 So. 27th St., Milwaukee, Wis.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
West Steel Castings Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Gray Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Forest City-Walworth Run Foundries, W. 27th and N. P. R. R., Cleveland, O.
Lake Shore Engine Works, Marquette, Mich.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The Avonmore, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engr. & Fdry. Co., Farmers Bank Bldg., Pittsburgh, Pa.

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.
National Alloy Steel Co., Blawnox, Pa.

CASTINGS (Malleable)
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Meeker Foundry Co., Clay & Ogden Sts., Newark, N. J.
Peoria Malleable Castings Co., Peoria, Ill.
Vermilion Malleable Iron Co., 200 No. Sixth Ave., Hoopestown, Ill.

CASTINGS (Manganese Steel)
Alloy Cast Steel Co., The, Marion, Ohio.
Commercial Steel Casting Co., Marion, Ohio.
Damascus Steel Casting Co., New Brighton, Pa.

CASTINGS (Nickel Chromium)
Alloy Cast Steel Co., The, Marion, Ohio.
Driver-Harris Co., Harrison, N. J.

CASTINGS (Steel)
Alloy Cast Steel Co., The, Marion, Ohio.
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Commercial Steel Casting Co., Marion, Ohio.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Maynard Electric Steel Casting Co., 2558 So. 27th St., Milwaukee, Wis.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh, Pa.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Treadwell Engineering Co., Easton, Pa.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh, Pa.
West Steel Castings Co., The, 805 E. 70th St., Cleveland.

CASTINGS (Worm & Gear Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTORS (Plate Mills)—See PLATE CASTORS

CEMENT (High Temperature)
Carborundum Co., The, Perth Amboy, N. J.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

CHAIN MACHINERY
Nilson, A. H., Machine Co., Bridgeport, Conn.

CHAINS (For Drives, Conveyers & Elevators)
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHARCOAL
Hillman Coal & Coke Co., First Nat. Bk. Bldg., Pittsburgh, Pa.

CHARGING MACHINES (Cupola)
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.)

CHROME ORE
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City

CLEANING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.

COAL AND COKE
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O
Hanna Furnace Corp., The, Detroit, Mich.
Hillman Coal & Coke Co., First Nat. Bk. Bldg., Pittsburgh, Pa
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

COAL, ORE and ASH HANDLING MACHINERY
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.) (Niles Crane Div.) (Sprague Hoist Div.)

COKE—See COAL AND COKE

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O

COKE OVENS (By-Product)
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh

COMPENSATORS (Automatic)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

COMPRESSORS (Air)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

CONCRETE REINFORCING BARS —See BARS (Concrete Reinforcing)

CONDENSERS (Surface, Barometric, Multi-Jet)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CONDUITS (Electric)
Youngstown Sheet & Tube Co., Youngstown, O.

CONSTRUCTION (Industrial Buildings)
Austin Co., The, 16112 Euclid Ave., Cleveland, O

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROLLERS (Electric)
Cutler-Hammer, Inc., 1265 St. Paul Ave., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Ideal Electric & Mfg. Co., Mansfield, O.

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Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

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Section M-41

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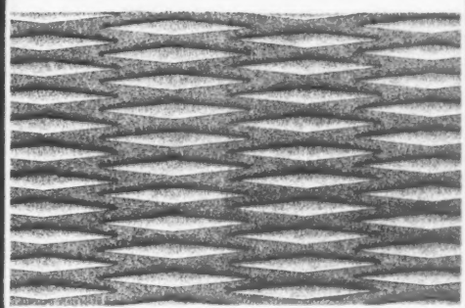

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Mathews Conveyer Co., Ellwood City, Pa.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYERS (Roller, Belt and Pallet)
Mathews Conveyer Co., Ellwood City, Pa.

COTTER PINS
Hindley Mfg. Co., Valley Falls, R. I.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.

COUPLINGS (Flexible)
Bartlett-Hayward Co., 200 Scott St., Baltimore, Md.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.

CRANES (Charging)
Alliance Machine Co., The, Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee.
Morgan Engineering Co., Alliance, O.

CRANES (Creeper, Erection)
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Road, Chicago, Ill.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago, Ill.

CRANES (Electric)
Alliance Machine Co., The, Alliance, O.
Box Crane & Hoist Corp., Janney & E. Ontario Sts., Philadelphia, Pa.
Cleveland Crane & Engrg. Co., The, Wickliffe, O.
Euclid-Armington Corp., 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee.
Morgan Engineering Co., Alliance, O.
Roeper Crane & Hoist Wks., 1729 No. 10th St., Reading, Pa.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.) (Niles Crane Div.)
Whiting Corp., Harvey Ill.

CRANES (Gantry)
Cleveland Crane & Engineering Co., The, Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago, Ill.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Niles Crane Div.)
Whiting Corp., Harvey Ill.

CRANES (Hand)
Cleveland Electric Tramrail, Div. Cleveland Crane & Engr. Co., Wickliffe, O.
Euclid-Armington Corp., 1365 Chardon Rd., Euclid, O.
Roeper Crane & Hoist Wks., 1729 No. 10th St., Reading, Pa.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Niles Crane Div.)

CRANES (Jib)
Cleveland Electric Tramrail Div. Cleveland Crane & Engr. Co., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.)

CRANES (Locomotive)
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago, Ill.

CRANES (Portable)
Beatty Machine & Mfg. Co., 944-150th St., Hammond, Ind.

CRIMPING MACHINERY
Streine Tool & Mfg. Co., New Bremen, O.

CRUSHING, GRINDING & PULVERIZING MACHINERY
Morgan Engineering Co., Alliance, Ohio.

CUTTING & WELDING—See WELDING

CUTTING OILS
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.

DEOXIDIZERS
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

DIE BLOCKS
Bethlehem Steel Co., Bethlehem, Pa.
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Lukenweld, Inc., Coatesville, Pa.

DIE HEADS (Automatic)
Landis Machine Co., Waynesboro, Pa.

DIE STEEL
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.

DIES
Niagara Mach. & Tool Wks., 687-697 Northland Ave., Buffalo, N. Y.
Toledo Mach. & Tool Co., Toledo, O.

DOORS AND SHUTTERS (Steel, Fire and Rolling)
Truscon Steel Co., Pressed Steel Div., Youngstown, O.

DRAW BENCHES
Aetna-Standard Engineering Co., The, Youngstown, O.

DRILL RODS—See RODS (Drill)

DRILLING MACHINES (Multiple, Heavy Duty)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLING MACHINES (Radial)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLS (Twist)—See TWIST DRILLS

DRIVES (Cut Herringbone Gears)
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

DRIVES (Multi V-Belt)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.

ELEVATING & CONVEYING MACHINERY—See CONVEYERS

ELEVATORS (Bucket)
Link-Belt Co., 300 W. Pershing Road, Chicago, Ill.

ENGINEERS AND CONTRACTORS
Austin Co., The, 16112 Euclid Ave., Cleveland, O.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Pennsylvania Engineering Corp., New Castle, Pa.
Phoenix Bridge Co., 20 South 15th St., Philadelphia, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Wean Engineering Co., Inc., 2nd Nat. Bk. Bldg., Warren, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

ENGINEERS (Consulting)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.
Barstow, W. S., & Co., 120 Wall St., New York City.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
Kinkead, Robt. E., Builders Exchange, Cleveland, O.
Llewelyn, Thomas J., & Co., 911 Oliver Bldg., Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Perin Engineering Co., Inc., 11 West 42nd St., New York City.

ENGINEERS, CONSULTING (By-Product Coke Oven & Gas Plants)
Koppers Const. Co., 1301 Koppers Bldg., Pittsburgh.

ENGINES (Gas, Oil)
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago.

FACING MACHINES (Structural)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

FACTORY AND INDUSTRIAL BUILDINGS—See BUILDINGS (Industrial)

FANS (Portable)
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FERROALLOYS
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
International Nickel Co., 67 Wall St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROCARBON (Titanium)
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERROCHROME
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Vanadium Corp. of America, 120 Broadway, New York City

FERROMANGANESE
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa

FERROSILICON
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia.
Vanadium Corp. of America, 120 Broadway, New York City

FERROSILICON (Aluminum)
Vanadium Corp. of America, 120 Broadway, New York City

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 East 42nd St., New York City.
Vanadium Corp. of America, 120 Broadway, New York City

FERROVANADIUM
Vanadium Corp. of America, 120 Broadway, New York City

FIRE CLAY
Climax Fire Brick Co., Climax, Pa.
Haws Refractories Co., Johnstown Savings Bk. Bldg., Johnstown, Pa.

FLASKS (Foundry)
Truscon Steel Co., Youngstown, O.

FLOOR ARMORING
Blaw-Knox Co., 2002 Farmers Bk. Bldg., Pittsburgh, Pa.
Hendrick Mfg. Co., 48 Dundaff St., Carbondale, Pa.

FLOORING—STEEL
American Pressed Steel Co., Commercial Trust Bldg., Philadelphia
Blaw-Knox Co., 2002 Farmers Bk. Bldg., Pittsburgh, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., 48 Dundaff St., Carbondale, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill

FLOORS
Union Products Co., 1252 W. 70th St., Cleveland, O.

FLUORSPAR
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

FORGING BILLETS—See BILLETS (Forging)

FORGING MACHINERY
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.

FORGINGS (Brass, Bronze, Copper)
Revere Copper & Brass, Inc., 230 Park Ave., New York City

FORGINGS (Drop)
Bethlehem Steel Co., Bethlehem, Pa.
Canton Forge & Axle Co., 2003-2035 Dueber Ave., Canton, O.
Fruin Drop Forge Co., 341-355 W. Root St., Chicago.
Queen City Forging Co., 235 Tennyson St., Cincinnati, O.
Rockford Drop Forge Co., Rockford, Ill.

FORGINGS (Hollow Bored)
National Forge & Ordnance Co., Irvine, Warren Co., Pa.

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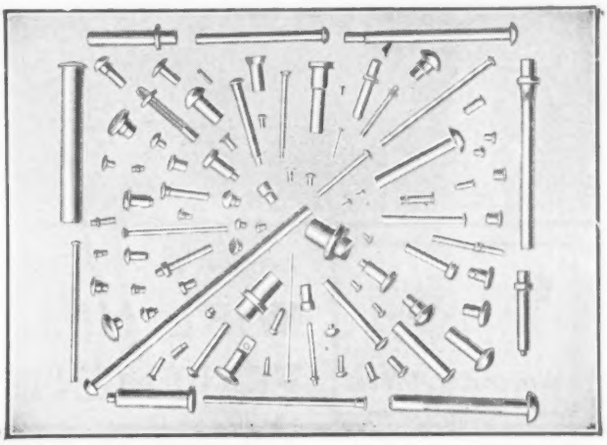

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Midvale Co., The, Nicetown, Philadelphia, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Rockford Drop Forge Co., Rockford, Ill.

FORGINGS (Upset)
Bethlehem Steel Co., Bethlehem, Pa.

FOUR-SLIDE MACHINES
Nilson, A. H., Machine Co., Bridgeport, Conn.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FURNACE CONTROLS (Open Hearth)
Morgan Construction Co., Worcester, Mass.

FURNACE INSULATION—See INSULATION

FURNACES (Blast)
Brassert, H. A., & Co., 310 S. Michigan Ave., Chicago.
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
McClintic-Marshall Corp., Bethlehem, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland.

FURNACES (Continuous Pair)
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Surface Combustion Co., 2375 Dorr St., Toledo, O.

FURNACES (Electric Heating)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Hevi Duty Eectric Co., 4100 Highland Blvd., Milwaukee, Wis.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa.

FURNACES (Electric Melting)
Ajax Electrothermic Corp., Trenton, N. J.
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa.

FURNACES (Forging)
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Surface Combustion Co., 2375 Dorr St., Toledo, O.

FURNACES (Open-Hearth)
Criswell, James, Co., Keenan Bldg., Pittsburgh.
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.

FURNACES (Recuperative)
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.

FURNACES (Sheet and Tin Mills)
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Inc., 2nd Nat. Bk. Bldg., Warren, O

FURNACES (Steel Mill)
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Strong Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa

FURNACES (Steel Treating, Annealing & Case Hardening)
Carborundum Co., Perth Amboy, N. J.
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Hevi Duty Electric Co., 4100 Highland Blvd., Milwaukee, Wis.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Rust Engineering Co., 2600 Koppers Bldg., Pittsburgh, Pa
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa.

GALVANIZING PLANTS — FOR SHEETS
Aetna-Standard Engineering Co., The, Youngstown, O.
Wean Engineering Co., Inc., 2nd Nat. Bk. Bldg., Warren, O

GAS HOLDERS
McClintic-Marshall Corp., Bethlehem, Pa.

GAS METERS—See METERS (Gas and Air)

GAS PRODUCER PLANTS
Flinn & Dreffein Co., 308 W. Washington St., Chicago.
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Semet-Solvay Engineering Co., 40 Rector St., New York, N. Y.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

GAS RECOVERY COKE OVEN & GAS PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

GAUGES (Indicating and Recording)
General Electric Co., Schenectady, N. Y.

GEAR BLANKS
Bethlehem Steel Co., Bethlehem, Pa
Lukenweld, Inc., Coatesville, Pa.

GEAR GENERATORS
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.

GEARS AND GEAR CUTTING
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.
General Electric Co., Schenectady, N. Y.
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Simonds Mfg. Co., 25th St. & Liberty Ave., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh.

WHERE-TO-BUY

GENERATING SETS
General Electric Co., Schenectady, N. Y.

GENERATORS (Acetylene)—See ACETYLENE GENERATORS

GENERATORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Ideal Electric & Mfg. Co., Mansfield, O.
Lincoln Electric Co., The, Cleveland, O., Dept. 20-12.

GRATING (Non-Slipping)
Blaw-Knox Co., 2002 Farmers Bk. Bldg., Pittsburgh, Pa.
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.

GRINDERS (Electric Pneumatic, Portable)
Cleveland Pneumatic Tool Co., The, 3734 E. 78th St., Cleveland, O.

GRINDERS (Roll)
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.

GRINDING MACHINES (Plain and Universal)
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES (Roll)
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES (Tool and Cutter)
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING WHEELS
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

HAMMER BOARDS (Drop)
Detroit Drop Hammer Board Co., 3874 Grand River Ave., Detroit, Mich.

HAMMER RAMS
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.

HAMMERS (Chipping, Riveting, Calking)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.

HAMMERS (Drop)
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Morgan Engineering Co., Alliance, O.
Toledo Mach. & Tool Co., Toledo, O.

HAMMERS (Power)
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

HAMMERS (Steam)
Alliance Machine Co., The, Alliance, O.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Morgan Engineering Co., Alliance, O.

HANGERS (Door)
Myers, F. E., & Bro. Co., The, Ashland, O.

HANGERS (Shaft)
Hyatt Roller Bearing Co., Harrison, N. J.

HEATERS (Electric Roll)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.

HEAT TREATING (Commercial)
Bantam Ball Bearing Co., The, South Bend, Ind.
Lakeside Steel Improvement Co., 5418 Lakeside Ave., Cleveland, O

HOISTING MACHINERY
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.) (Sprague Div.)

HOISTS (Chain Block)
Ford Chain Block Co., 2nd & Diamond Sts., Philadelphia, Pa.

HOISTS (Electric)
Box Crane & Hoist Corp., Janney & E. Ontario Sts., Philadelphia, Pa.
Cleveland Electric Tramrail, Div of the Cleveland Crane & Engr Co., Wickliffe, O.
Euclid-Armington Corp., 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Roeper Crane & Hoist Works, 1729 N. 10th St., Reading, Pa.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.) (Sprague Hoist Div.)

HOISTS (Monorail)
Euclid-Armington Corp., 1365 Chardon Rd., Euclid, O
Ford Chain Block Co., 2nd & Diamond Sts., Philadelphia, Pa.
Shepard Niles Crane & Hoist Co. 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.)

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Ford Chain Block Co., 2nd & Diamond Sts., Philadelphia, Pa.

HOOPS AND BANDS
Acme Steel Co., 2840 Arthur Ave., Chicago, Ill.
Ryerson, Joseph T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Sharon Steel Hoop Co., Sharon, Pa
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

HOT BEDS
Aetna-Standard Engineering Co., The, Youngstown, O.
Treadwell Engineering Co., Easton, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

HOT BLAST STOVES
Brassert, H. A., & Co., 310 S. Michigan Ave., Chicago, Ill.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

HYDRAULIC MACHINERY
Bethlehem Steel Co., Bethlehem, Pa
Morgan Engineering Co., Alliance, O.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

INGOT MOLDS
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Gathmann Engineering Co., Baltimore, Md.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Corp., Hubbard, Ohio.

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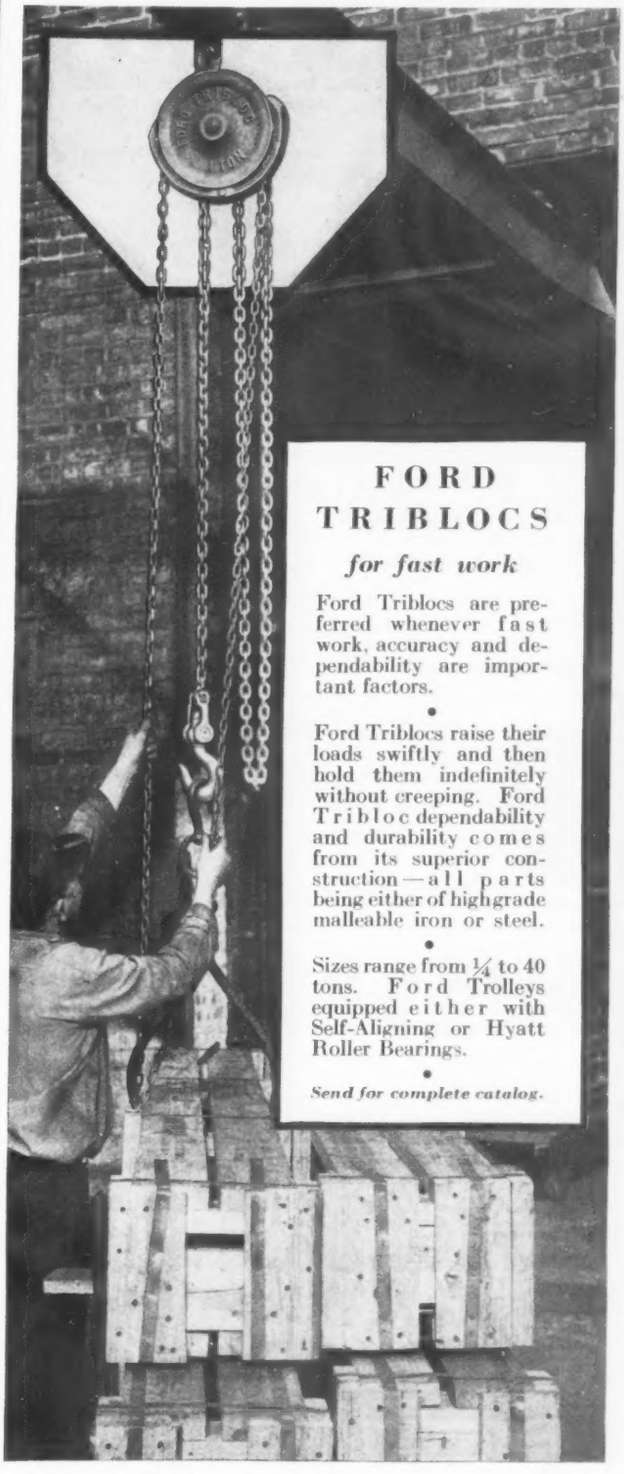

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Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

INSULATING BLOCK
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

INSULATING BRICK
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

INSULATING POWDER AND CEMENT
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

INSULATION (Furnace, Boiler Settings, Ovens, Etc.)
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

IRON (Bar)
Bethlehem Steel Co., Bethlehem, Pa.
Burden Iron Co., Troy, N. Y.

IRON ORE
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna Furnace Corp., The, Detroit, Mich.
Hillman Coal & Coke Co., 1st Nat. Bk. Bldg., Pittsburgh.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.

KNIVES AND SHEAR BLADES—See **SHEAR BLADES AND KNIVES**

LATHE DOGS
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

LATHES
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago, Ill.

LATHES (Roll Turning)
Lewis Fdry. & Mach. Co., P. O. Box 1591, Pittsburgh, Pa.
United Engr. & Fdry. Co., Farmers Bank Bldg., Pittsburgh, Pa.

LEAD POTS—See **POTS**

LETTERHEADS (Engraved)
Wiggins, John B., Co., The, Fullerton & Racine Aves., Chicago, Ill.

LEVELING MACHINES
Aetna-Standard Engr. Co., The, Youngstown, O.
Sutton Engineering Co., Park Ave., Pittsburgh, Pa.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh, Pa.
Wean Engineering Co., Inc., 2nd Nat. Bk. Bldg., Warren, O.

LIFTING MAGNETS—See **MAGNETS (Lifting)**

LININGS (Blast Furnaces)
Haws Refractories Co., Johnstown Savings Bank Bldg., Johnstown, Pa.

LOCOMOTIVE CRANES—See **CRANES (Locomotive)**

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES (Storage Battery)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.

LUGS (Terminal)
Wolverine Tube Co., 1435 Central Ave., Detroit, Mich.

LUMBER (Creosoted or Zinc)
Century Wood Preserving Co., Koppers Bldg., Pittsburgh, Pa.

MACHINE WORK
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

MACHINERY (Special)
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Lewis Fdry. & Mach. Co., P. O. Box 1591, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
National Roll & Fdry Co., Avonmore, Pa.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Sutton Engr. Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Eaton, Pa.

MAGNESITE (Dead Burned)
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

MAGNETIC SEPARATORS—See **SEPARATORS (Magnetic)**

MAGNETS (Lifting)
Cutler-Hammer, Inc., 1265 St. Paul Ave., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland.
Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, O.

MANGANESE METALS
Electro Metallurgical Sales Corp., 80 E. 42nd St., New York City.

MANGANESE ORE
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

MATERIAL HANDLING EQUIPMENT
Mathews Conveyer Co., Ellwood City, Pa.

METAL (Perforated)—See **PERFORATED METAL**

METAL CLEANERS
American Chemical Paint Co., Ambler, Pa.

METAL SPECIALTIES AND PARTS—See **STAMPINGS**

METAL STAMPINGS—See **STAMPINGS**

METAL WORKING MACHINES—See **SHEET METAL WORKING MACHINERY**

METALS (Nonferrous)
International Nickel Co., 67 Wall St., New York City.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

METERS (Flow)
Republic Flow Meters Co., 2235 Diversey Parkway, Chicago

METERS (Gas and Air)
Cutler-Hammer, Inc., 1265 St. Paul Ave., Milwaukee, Wis.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar)—see **ROLLING MILL EQUIPMENT**

MIXING, KNEADING, TEMPERING AND PUGGING MACHINERY
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

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MOLDING MACHINES
Herman Pneumatic Mach. Co., 806 Union Bk. Bldg., Pittsburgh, Pa.

MOLDS (Ingot)—See INGOT MOLDS

MOLYBDENUM
Vanadium Corp. of America, 120 Broadway, New York City.

MONEL METAL (All Commercial Forms)
International Nickel Co., 67 Wall St., New York City.

MONORAIL SYSTEMS
Cleveland Electric Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, O.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.)

MOTORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Century Electric Co., 1806 Pine Ave., St. Louis, Mo.
Fairbanks, Morse & Co., 900 S. Michigan Ave., Chicago.
General Electric Co., Schenectady, N. Y.
Ideal Electric & Mfg. Co., Mansfield, Ohio.
Lincoln Electric Co., The, Cleveland, O., Dept. 20-12.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland, O.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Reading Iron Co., Reading, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.

NAILS (Coated and Galvanized)
Youngstown Sheet & Tube Co., The, Youngstown, O.

NICKEL (All Commercial Forms)
International Nickel Co., 67 Wall St., New York City.

NICKEL (Shot)
International Nickel Co., 67 Wall St., New York City.

NICKEL-CHROMIUM (Shot)
Driver-Harris Co., Harrison, N. J.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.

NUTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

OPEN-HEARTH FURNACES—See FURNACES (Open-Hearth)

OVENS (Coke, By-Product Recovery)
Koppers Const. Co., The, 1301 Koppers Bldg., Pittsburgh, Pa.

OVENS (Core and Mold)
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING

OXYGEN IN CYLINDERS
Linde Air Products Co., 30 E. 42nd St., New York City.

PAINTING (Industrial)
Kiefer Sheeting & Painting Co., House Bldg., Pittsburgh, Pa.

PERFORATED METAL
Chicago Perforating Co., 2445 W. 24th Place, Chicago, Ill.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago.
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

PICKLING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PICKLING EQUIPMENT
International Nickel Co., 67 Wall St., New York City.

PICKLING MACHINERY
Aetna-Standard Engr. Co., The, Youngstown, O.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

PIG IRON
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Republic Steel Corp., Youngstown, Ohio.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Corp., Hubbard, Ohio.

PIG IRON (Charcoal)
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.

PINIONS—See GEARS AND GEAR CUTTING

PIPE (Brass, Bronze, Copper)
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

PIPE (Steel)
American Solling Mill Co., Middletown, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Products Co., Union Trust Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Smith, A. O., Corp., 27th & Keefe Sts., Milwaukee, Wis.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PIPE (Wrought Iron)
Reading Iron Co., Reading, Pa.

PIPE (Wrought Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

PIPE BALLS (Steel, Welding)
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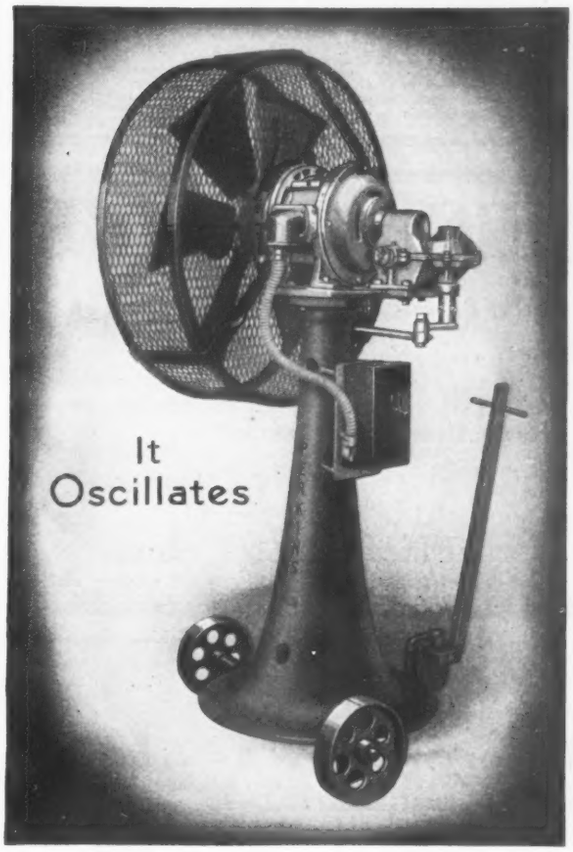

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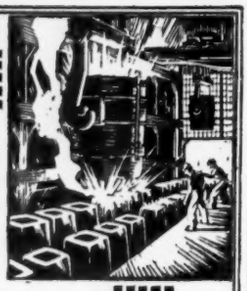

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Pittsburgh Valve Foundry & Construction Co., 26th & A. V. R. R., Pittsburgh, Pa.

PIPE LINES (Riveted & Welded)
McClintic-Marshall Corp., Bethlehem, Pa.

PIPE MILL MACHINERY
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Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

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Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
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Pittsburgh Valve Foundry & Construction Co., 26th & A. V. R. R., Pittsburgh, Pa.
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PLATES (Iron and Steel)
American Rolling Mill Co., Middletown, O.
Central Iron & Steel Co., Harrisburg, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Sheared and Universal)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City Steel Co., Granite City, Ill.
Illinois Scully Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Illinois Steel Co., 208 S. Lasalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Lukenweld, Inc., Coatesville, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Youngstown Sheet & Tube Co., The, Youngstown, O.

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Niagara Mach. & Tool Wks., 687-697 Northland Ave., Buffalo, N. Y.
Toledo Mach. & Tool Co., Toledo, O.

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Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
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RODS (Wire)—See WIRE PRODUCTS

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Alliance Machine Co., The, Alliance, O.
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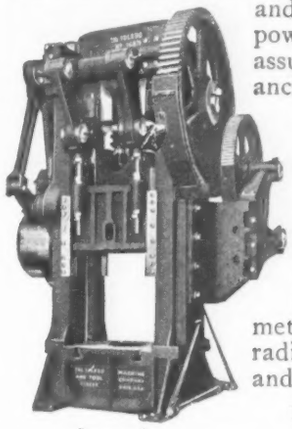

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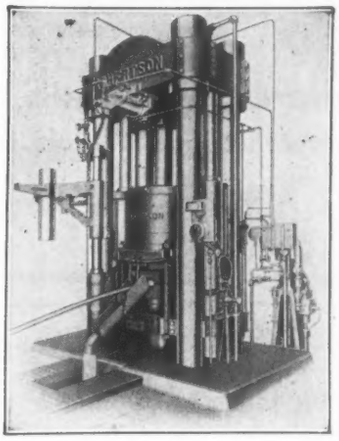

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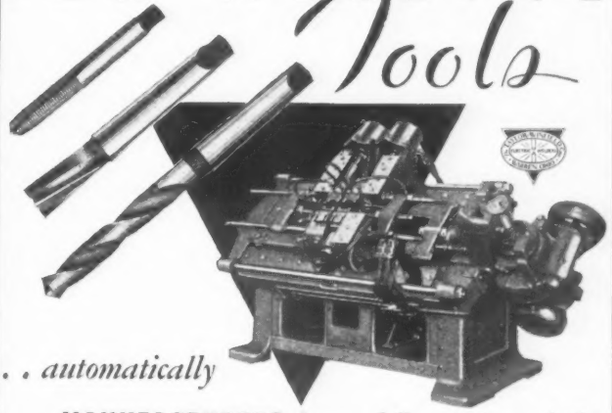

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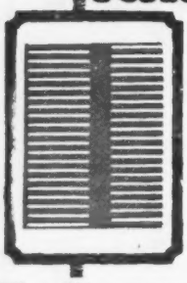

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Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

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Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Superior Steel Corp., 3122 Grant Bldg., Pittsburgh, Pa.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wyckoff Drawn Steel Co., Frick Bldg., Pittsburgh, Pa.

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Colonial Steel Co., Grant Bldg., Pittsburgh, Pa.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Roller Bearing Co., The, Canton, O.
Wyckoff Drawn Steel Co., Frick Bldg., Pittsburgh, Pa.

STEEL (Alloy, Cold Drawn)
Associated Alloy Steel Corp., Union Trust Bldg., Cleveland, O

STEEL (Alloy, Cold Finished)
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Moltrup Steel Products Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Wyckoff Drawn Steel Co., Frick Bldg., Pittsburgh, Pa.

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Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
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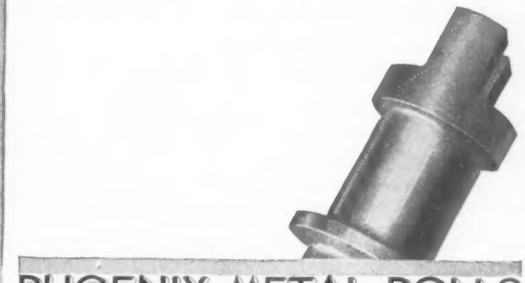

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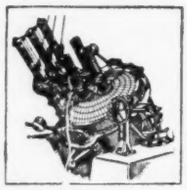
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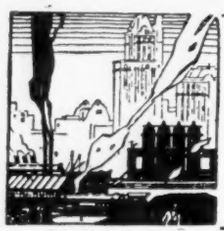
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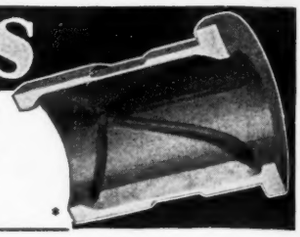

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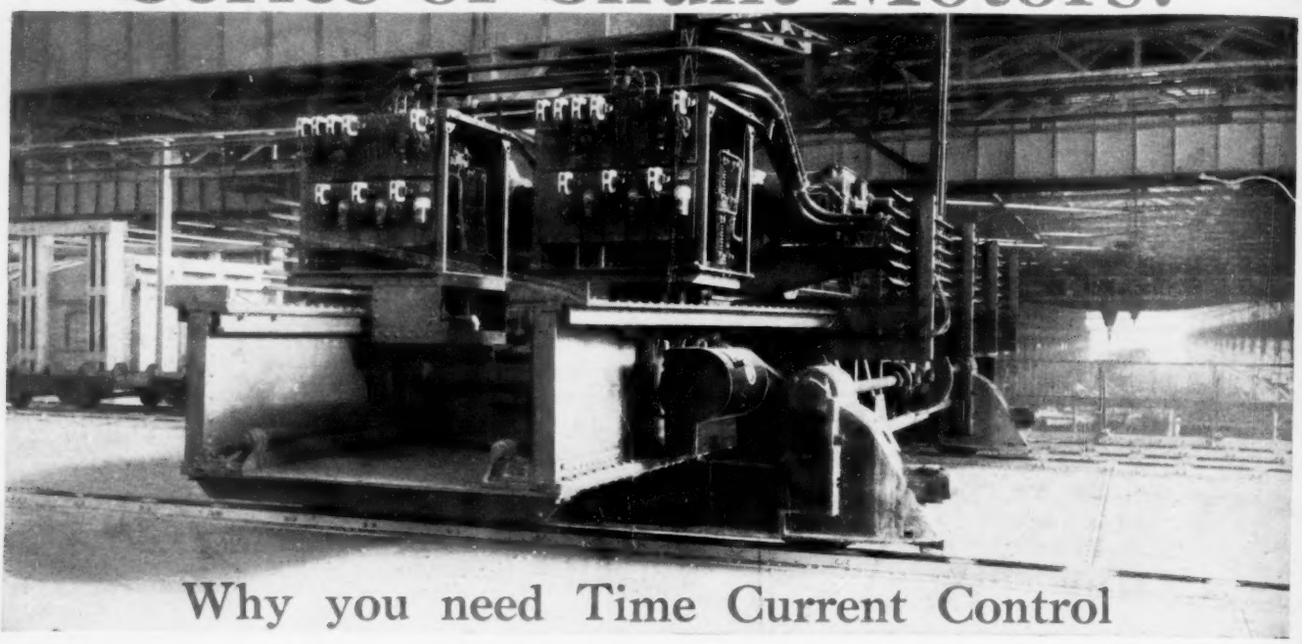

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